

A BUSINESS MODEL FOR ARCHITECTS:  
FILLING GAP FINANCING WITH CROWDFUNDING TO  
DEVELOP MID-RISE AFFORDABLE HOUSING ON O'AHU

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## **Dedication**

To my family – thank you for showing me the value of devotion and hard work.

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I would like to thank Andrew Neuman for providing insight on how the strength of great design through architecture in affordable housing can empower those in need. Thank you to R.J. Martin for paving the way and sharing your wisdom in the world of development in Hawai'i. Also, thank you to Jocelyn Iwamasa from the Hawai'i Housing Finance and Development Corporation who was extremely helpful in answering my endless questions about the LIHTC program.

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## **Abstract**

With the ever-rising prices of fee simple homes, providing more rental housing for Hawai'i residents who fall under the 80% area median income is a step in mitigating the housing shortage in Hawai'i. The finances for such a market require the knowledge of seasoned developers who are adept with amassing funds that include government subsidies, bank loan, and other types of financing.

Architects focus on the quality of designs and are not usually trained in understanding the finances of development. Such a topic is often overlooked, resulting in the initial design of projects to be greatly compromised to fit the developer's needs. Therefore, it is important for designs to be guided by the total cost of development.

This dissertation is a guideline to create a business model which incorporates a crowdfunding method to help give architects more opportunities to create desirable and well-designed affordable housing projects in Hawai'i. This business proposal will connect surrounding communities by encouraging participation in future developments while providing more homes to low-income households.

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## Definitions

**Affordable Housing:** There is no fixed amount to constitute affordable housing, but for the purpose of this study – rental housing for occupants paying less than 30 percent of their rent and are at or below 80% of the median income level in a certain area.

**Capital Stack:** The capital stack or Total Development Cost is defined as the financing plan constructing low-income rental housing. Typical components which make up the capital stack include hard debt, soft debt, hard equity, and soft equity.

**Hard Debt:** A component included in the capital stack - the bank's loan, which is normally constrained by a loan-to-value (LTV) ceiling, where value equals the mortgage value of the expected rental income. In affordable housing projects the government may offer favorable terms to help lower the cost of capital to the developer, therefore allowing higher leveraging and cheap interest rates.

**Soft Debt:** A component included in the capital stack – loan between hard debt and hard equity. This loan is typically paid after the hard debt and before the hard equity which include competitive federal grant programs to cities and urban counties which are experiencing economic distress in order to help stimulate economic development activity needed to aid in economy recovery.

**Gap Financing:** A component included in the capital stack – Additional sources of financing that the developer of a housing project must attain if the amount of funds to begin a project are insufficient. These sources of funds include, but are not limited to grants, housing trust funds, and nonprofit organizations interested in promoting affordable housing.

**Hard Equity:** A component included in the capital stack – developer's/owner's down payment and the owner's appreciation. To aid in affordability, the government typically offers financial grants and down payment assistance.

**Soft Equity:** A component included in the capital stack – Low-Income Housing Tax Credits (LIHTC) is an example of a program that create a public-private partnership (P3) to stimulate private investment in a project.

**Low-Income Housing Tax Credits (LIHTC):** A program that accounts for approximately 90% of all affordable rental housing created in the United States. Created by the Tax Reform Act of 1986, this program allows for LIHTC-allocating agencies the equivalency of almost \$8 billion in annual budget to issue tax credits for the acquisition, rehabilitation, or new construction of rental housing targeted at low-income households. The LIHTC program encourages private equity to be used in the development of affordable housing projects aimed at low-income households. Each state has its own entity to administer LIHTC. In Hawai'i, the Hawai'i Housing Finance and Development Corporation (HHFDC) administers the LIHTC program.<sup>1</sup>

**Hard/Construction Costs:** Expenses in a development project which include but are not limited to construction work, site work, contractor profit, contractor overhead

**Soft/Interim Costs:** Expenses in a development project which include but are not limited to accounting costs, advertising and marketing, appraisal, architect fee, building permits, consulting, engineer fee, insurance, legal fee, payment, and performance for bonds, property taxes

**Underwrite:** sign and accept liability under (an insurance policy), thus guaranteeing payment in case loss of damage occurs; accept (a liability or risk) under an insurance policy

**Crowdfunding:** A practice of funding a project or venture by raising small amounts of money from many people, typically through the internet.

**Backer(s):** An individual(s) who contribute to a crowdfunding venture

**Pledge:** Amount of money a Backer will contribute to a Crowdfunding venture

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<sup>1</sup> Hawaii Community Development Authority. "Definitions - DBEDT Hawaii." Hawaii.gov. June 2013. Accessed April 2, 2019. <http://dbedt.hawaii.gov/hcda/files/2013/06/Definitions.pdf>.

Nimbyism: not in my backyard; used to express opposition by local citizens to locating in their neighborhood of a civic project, as a jail, garbage dump, or drug rehabilitation center, that, though needed by the larger community is considered unsightly, dangerous, or likely to lead to a decreased property values<sup>2</sup>

Net Operating Income (NOI): A calculation – used to analyze income generating real estate investments

Area Median Income (AMI): A midpoint of a general region's income distribution

Rent Roll: Total amount of income generated from rental units in a project

Debt Service Ratio: The ratio of cash available for debt servicing interest, principal, and lease payments

Annual Percentage Yield (APY): Annual rate of return considering compounding interest

Equity: A risk interest or ownership right in property

Return/Dividend: A sum of money paid regularly by a company to its shareholders from the profits

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<sup>2</sup> Dictionary.com. Accessed April 02, 2019. <https://www.dictionary.com/browse/nimbyism>.

## Preface

Arthur Gensler, the founder of globally acclaimed architecture firm, Gensler says, “The best thing about giving is that you always get more than you give.”<sup>3</sup>

As a young and aspiring individual on the brink of entering the workforce, I have always felt a drive to use what I have learned from architecture school to help others. There are many concepts in the field of architecture, but one that I was most intrigued about was the ability to manifest an intangible idea and turn it into a reality. What’s more, the idea would have the power to positively impact another individual’s life. After pondering on the implication to utilize design for the greater good, I realized two things: one, design does not have to impact a single individual at a time, it could be for a whole community of multiple individuals; and two, I cannot do this on my own.

Positively impacting an individual would be nice, but simultaneously impacting a whole community of over a hundred people is my goal. I would need to put a strong team together to execute such a large-scale plan and doing it on my own is impossible. I believe in the saying, “there is strength in numbers.” Therefore, I felt that I would require help from not only talented professionals but also from surrounding communities as well.

My dream to positively impact multiple individuals through architecture needed a well thought out plan. The plan needed to provide an incentive for everyone who is willing to help those in need. Being surrounded by a system that is driven by

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<sup>3</sup> Gensler, Arthur, and Michael Lindenmayer. *Art's Principles: 50 Years of Hard-learned Lessons in Building a World-class Professional Services Firm*. Wilson Lafferty, 2015.

currencies and policies, I felt that this plan needed to include concepts from architecture and business to overcome all these hurdles.

Arthur Gensler could not have said it better in his book, he set the standard for running a professional services firm which stretches throughout the globe. I aim to employ this idea of giving to get more in return through this research.

## Introduction

There are two issues that this dissertation will address. First, issue of gathering finances to build more affordable housing in Hawai'i will be discussed. Second, is the importance of architects to become developers in tackling the issue of building more affordable housing in Hawai'i. A business model will be proposed to arrange the proper finances of developing a mid-rise affordable housing project, led by an architect as a developer.

## Affordable Housing Development

There is a shortage of housing in Hawai'i. According to an analysis of the past and forecast of the future done on construction and Hawai'i's economy by the State of Hawai'i Department of Business, Economic Development and Tourism - more than 5,200 new housing units must be developed to house the projected population growth until 2020.<sup>4</sup> There are many challenges to developing such a large amount of inventory. What's more, affordability poses as the underlying issue for increasing the availability for housing.

A new national report from Coldwell Banker puts the average listing price of a four-bedroom, two-bathroom home in Hawai'i at \$904,954.<sup>5</sup> An average price to purchase a two-bedroom home is unreasonable for families who fall under the 100% area median income (AMI), which amounts to \$96,000 per year in annual income by

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<sup>4</sup> "Construction and Hawaii's Economy." Hawaii.gov. February 2014. Accessed February 22, 2019. [http://files.hawaii.gov/dbedt/economic/data\\_reports/construction\\_industry.pdf](http://files.hawaii.gov/dbedt/economic/data_reports/construction_industry.pdf).

<sup>5</sup> Staff, HNN. "Hawaii Average Home Prices Highest in Nation." Home - Hawaii News Now - KGMB and KHNL. September 13, 2016. Accessed December 14, 2018. <http://www.hawaiinewsnow.com/story/33076482/report-hawaii-home-prices-top-nation-again/>.



the Hawai'i Community Development Authority (HCDA).<sup>6</sup> Therefore, rental units are the most viable way for what families of four persons who fall under the less than 80% AMI can afford.

Assuming material costs and land costs are similar, often land is leased or granted by the state for affordable housing, rental housing costs the same to develop as market rate housing. The lack of rental income to leverage towards the development cost may be compensated through forms of government subsidies. There are many hurdles and limitations in obtaining government subsidies and the availability of such funds are not always guaranteed. Therefore, a gap in the capital stack for affordable housing developments require developers to look elsewhere for sources of funds.

Crowdfunding is an option for filling gap financing when government subsidies and bank loan are insufficient to cover the total development cost of affordable housing. Also, it is much faster to obtain funds from a crowdfunding campaign than conventional methods of capital campaign. In Appendix A, Kakaako Project A includes capital campaign in the capital stack, but took several years to fundraise \$3 million. Kevin Cavanaugh of Guerrilla Development was able to raise \$300,000 in just 3 days of crowdfunding a project to develop housing.<sup>7</sup> Therefore, in some cases for development, a marginal amount of funding can be obtained in a short amount of time through crowdfunding.

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<sup>6</sup> "Hawaii Community Development Authority 2018 Reserved Housing Income Limits." Accessed April 2, 2019. <https://dbedt.hawaii.gov/hcda/files/2018/04/HCDA-2018-AMI.pdf>.

<sup>7</sup> Petty, James. "Crowdfunding Architecture." Architect & Developer. January 25, 2019. Accessed April 02, 2019. <http://architectanddeveloper.com/crowdfunding-architecture/>.

## **Architects and Developers**

There are many relationship models in which architects and developers interact in the construction industry. In conventional relationships between architects and developers, there are inefficiencies. Inefficiencies can be addressed by combining the two roles where the architect is the developer. Consolidation between the two will help mitigate the disconnect that they have in the design process and pose several advantages. Also, the decision to choose highly efficient tools to aid in the development will be a seamless process, if delegated by the architect as a developer. Another issue to consider is that architects are usually at the mercy of the developer's needs in design decisions. Ultimately, understanding the finances for a project will help guide the decision of the architect as a developer to improve the design.

The design of affordable housing plays a key role in the success of each project. Funding affordable housing is difficult because the total cost of construction is equal to that of market-rate housing, but that does not mean the design of the projects should be negatively impacted. Desirability to live in future developments directly affects its vacancy rates. Therefore, aesthetics and connection to the community are important components which must be strongly executed through design. Developers and architects do not always share the same goal in producing a well-designed building for the community. Therefore, projects should be led by architect-developers because they are more inclined to prioritize the importance of the design.

## Doctoral Study Organization

This dissertation is organized into three parts – affordable housing and crowdfunding, envisioning architect as a developer, and a business model which outlines the benefits of crowdfunding in affordable housing development by an architect as a developer.

Part 1 of this dissertation will address crowdfunding as an alternative approach for filling gap financing in a capital stack to develop an affordable housing project. This thesis demonstrates the benefits of crowdfunding to generate capital because sources of funding for a development is not always readily available for developers to obtain. Another advantage is that crowdfunding provides opportunities for amassing funds in a short amount of time. An explanation of a typical structure for financing affordable housing will be covered, including details of government subsidies that are available. From there, the idea of crowdfunding will be described. The approach of combining government subsidy and crowdfunding in the capital stack for affordable housing development will be a basis for opportunity in encouraging people of Hawai'i to directly influence development. Based on the calculations and credibility for such a method, anyone may potentially contribute to mitigating one of Hawai'i's biggest challenges in providing more affordable housing for those in need.

Part 2 will address the advantages that result when an architect also serves as a developer of an affordable housing project. Conventional relationships between the architect and developer often separate the roles of creativity and feasibility. Advantages include direct savings in the total cost of development and improving the quality of the design for the development. Architects are often trained to draw and

design for projects but are not always adept in allowing the feasibility of finances to inform their designs. Understanding the finances of a project is crucial to its success.

Part 3 of this thesis will cover the structure of a business model demonstrating through case studies and specific formulas on how crowdfunding and leadership by an architect-developer can become a guideline for future architects to take a stand at developing more affordable housing in Hawai'i.

# ***Part 1: Affordable Housing and Crowdfunding***

## **Chapter 1: Affordable Housing in Hawai'i**

There is a need for affordable housing in Hawai'i. Often times, the cost for building multifamily affordable housing is the same to build market rate multifamily housing, granted that land cost and material cost is similar. Therefore, amassing the funds to formulate the capital stack for such developments will pose challenges. The challenges include attaining enough government subsidies to offset the amount of needed funding. Although, there are many sources of government funding, they are not always guaranteed nor are they readily available for use to develop housing. Also, the rental income to construct a project is not enough to leverage through bank loans alone.

With that in mind, alternative methods for financing affordable housing developments must be considered. Currently, there are ways of implementing different types of loans which charge higher amounts of interest. But there are other means in amassing funds to fill the gap financing if government subsidies and bank loans are not enough. This dissertation aims to explore an alternative method in hopes of financing affordable housing development by proving that crowdfunding will work in Hawai'i. Crowdfunding has the potential to alleviate one of the top reasons for developing affordable housing - obtaining finances for initial development costs.

### **Barriers in Building Affordable Housing in Hawai'i**

Based on a Hawai'i Housing Planning Study prepared in 2016, major barriers for affordable housing include geographic limitation, construction costs, and government

regulations.<sup>8</sup> Physical limitations of this island state prevents development due to its make-up of excessive slopes and surrounding ocean. Therefore, development is based on the scarcity of land that is available.

Construction costs for multifamily developments vary throughout the nation, Phoenix averaging \$185 per square foot and San Francisco at \$430 per square foot.<sup>9</sup> Hawai'i doubles Phoenix by coming in at an average of \$445 per square foot. The reasons for such high prices in Hawai'i are related to local wages, unionization, and regulatory environment. What's more, cost for construction can greatly increase during construction boom periods. A project in Aiea, Hawai'i set to build work-force housing in 2015 was put on hold due to high cost of insurance and litigation.<sup>10</sup>

Housing regulations for the development of cities were meant to minimize arbitrary means for development practices and allow for more affordable housing to be built in times of demand for luxury condominiums. Barriers which inhibit the development of affordable housing projects include the lengthy process of attaining land use entitlement, fiscal policy, administrative processes, and the lack of consistency in reviews concerning the state and county in Hawai'i.<sup>11</sup> Therefore, State and County level complexities can lengthen the timeline for affordable housing developments.

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<sup>8</sup> SMS Research. "Hawaii Housing Planning Study, 2016." Hawaii.gov, December 2016. Accessed April 2, 2019. [dbedt.hawaii.gov/hhfdc/files/2017/03/State\\_HHPS2016\\_Report\\_031317\\_final.pdf](http://dbedt.hawaii.gov/hhfdc/files/2017/03/State_HHPS2016_Report_031317_final.pdf).

<sup>9</sup> Magin, Janis L. "Building a House in Honolulu Costs Nearly Twice as Much as Chicago, Report Shows." Bizjournals.com. July 6, 2017. Accessed April 2, 2019. <https://www.bizjournals.com/pacific/news/2017/07/05/building-a-house-in-honolulu-costs-nearly-twice-as.html>.

<sup>10</sup> Davis, Chelsea. "Massive Aiea 'workforce Housing' Condo Project on Hold." HawaiiNewsNow.com. July 07, 2016. Accessed April 2, 2019. <http://www.hawaiiNewsNow.com/story/32389776/massive-aiea-workforce-housing-condo-project-on-hold/>.

<sup>11</sup> SMS Research. "Hawaii Housing Planning Study, 2016." Hawaii.gov, December 2016. Accessed April 2, 2019. [dbedt.hawaii.gov/hhfdc/files/2017/03/State\\_HHPS2016\\_Report\\_031317\\_final.pdf](http://dbedt.hawaii.gov/hhfdc/files/2017/03/State_HHPS2016_Report_031317_final.pdf).

## **Chapter 2: Financial Resources for Affordable Housing Development**

There are many sources of financing that are available in developing affordable housing in the United States. Developers have the freedom to amass different types of financing, many of which are provided by the U.S government for use in Hawai'i but are not always enough to fill the capital stack for every project. Chapter 2 will cover the many types of funds available in both the U.S. and Hawai'i ranging from government subsidies to private sector financing.

### **Starting with policies in the U.S.**

The U.S. Department of Housing and Urban Development (HUD) has made attempts in promoting the finance for housing in the United States since 1932. Later, the Housing Act of 1949, a prevalent national housing policy was established in hopes of realizing, "the goal of a decent home and a suitable living environment for every American family."<sup>12</sup> Through this, federal loans, advances, and grants were authorized to help urban development for affordable housing. Although the attempt and goals were made, the deficiency for providing affordable housing is still apparent today.

Housing policies created by governments can directly influence many factors. These factors include the amount, the type, and the cost of housing that is to be built in specific areas. The support by the government include forms of federal programs

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<sup>12</sup> "U.S. Department of Housing and Urban Development Major Legislation on Housing and Urban Development Enacted Since 1932". Hud.Gov. Accessed 8 January 2019. [https://www.hud.gov/sites/documents/LEGS\\_CHRON\\_JUNE2014.PDF](https://www.hud.gov/sites/documents/LEGS_CHRON_JUNE2014.PDF).



like public housing, or block grants which provide local government the allowance to develop their own programs. Subsidy programs provide support for renovation of certain buildings or new construction for creating additional affordable housing. Government agencies can join partnerships with nonprofit or for-profit developers on such ventures.

The federal government provides subsidies for the development of low-income housing in two ways: (1) support the construction and operation of specific housing developments. (2) provide states with funds to develop their own program.

Regarding the first form of assistance, one of the nation's oldest low-income housing programs was established in 1937, known as project-based subsidies which include public housing.<sup>13</sup> Public housing provides safe and decent rental housing for eligible low-income families. HUD has helped provide public housing for approximately 1.2 million households, which are all managed by about 3,300 local housing agencies (HA).<sup>14</sup> The income limits are developed by HUD, setting low income limitations below 80% median income of the metropolitan area, and very low-income limits at 50% of said income.

The second form of federal housing subsidy include block grants which fund housing programs. These block grants are given to state and local governments based on formula basis and can be used in a variety of purposes. Block grants have restrictions with how they are used by states and localities. Community Development Block Grants (CDBG) is the oldest and largest block grant program,

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<sup>13</sup> Schwartz, Alex F. Housing Policy in the United States. New York: Routledge, 2015.

<sup>14</sup> "HUD.Gov / U.S. Department Of Housing And Urban Development (HUD)". Hud.Gov. Accessed 8 January 2019. [https://www.hud.gov/topics/rental\\_assistance/phprog](https://www.hud.gov/topics/rental_assistance/phprog).

which allows states the most flexibility in how the funds may be used. Another program which is given a less flexible option of usage than the CDGB is the HOME Investment Partnership program.

All in all, rental assistance is received by approximately 8.3 million low-income households.<sup>15</sup> 3.1 million units are made up by tax-exempt multifamily bonds, the HOME program, and Low-Income Housing Tax Credit.

## **Government Financing Mechanisms for Developing Affordable Housing**

There are many forms of financing mechanisms for the development of affordable housing in the U.S., many of which include government subsidies. The ones most widely used for low-income rental housing will be discussed in this thesis.

### **Low-Income Housing Tax Credits**

First and foremost, the largest subsidy used to produce low-income rental housing was the result of an item in the Internal Revenue Code. In 1986, the Tax Reform Act established the Low-Income Housing Tax Credit (LIHTC) program, which provided incentives to invest into low-income rental housing development. With LIHTC, for every tax credit that an investor receives, they can reduce their federal income tax by \$1. Furthermore, investors can receive tax credits for 10 years.

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<sup>15</sup> Schwartz, Alex F. Housing Policy in the United States. New York: Routledge, 2015.

After producing more than 2 million units since 1987, LIHTCs also accounts for about one-third of all new multifamily housing units in the nation.<sup>16</sup> Therefore, LIHTC has become the primary vehicle to produce low-income housing in the U.S.

## **LIHTC Mechanism**

The LIHTC program is complex and has an extensive process to be implanted into low-income rental housing developments. At a glimpse, there are a total of nine (9) steps to the process. Figure 1 explains the process of how to utilize low-income tax credits into building an affordable housing project.

First, the Internal Revenue Service allocates low-income housing tax credits based on each state's population. Since 2003, the total dollar amount of credits that would be available is adjusted for inflation. Up until 2002, tax credit allocations were set at \$1.25 per capita, but in 2002, they were increased to \$1.75 and set to adjust for inflation for every year onward.

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<sup>16</sup> Khadduri, Jill, Carissa Climaco, and Kimberly Burnett. Huduser.Gov, 2012. [https://www.huduser.gov/publications/pdf/what\\_happens\\_lihtc\\_v2.pdf](https://www.huduser.gov/publications/pdf/what_happens_lihtc_v2.pdf).

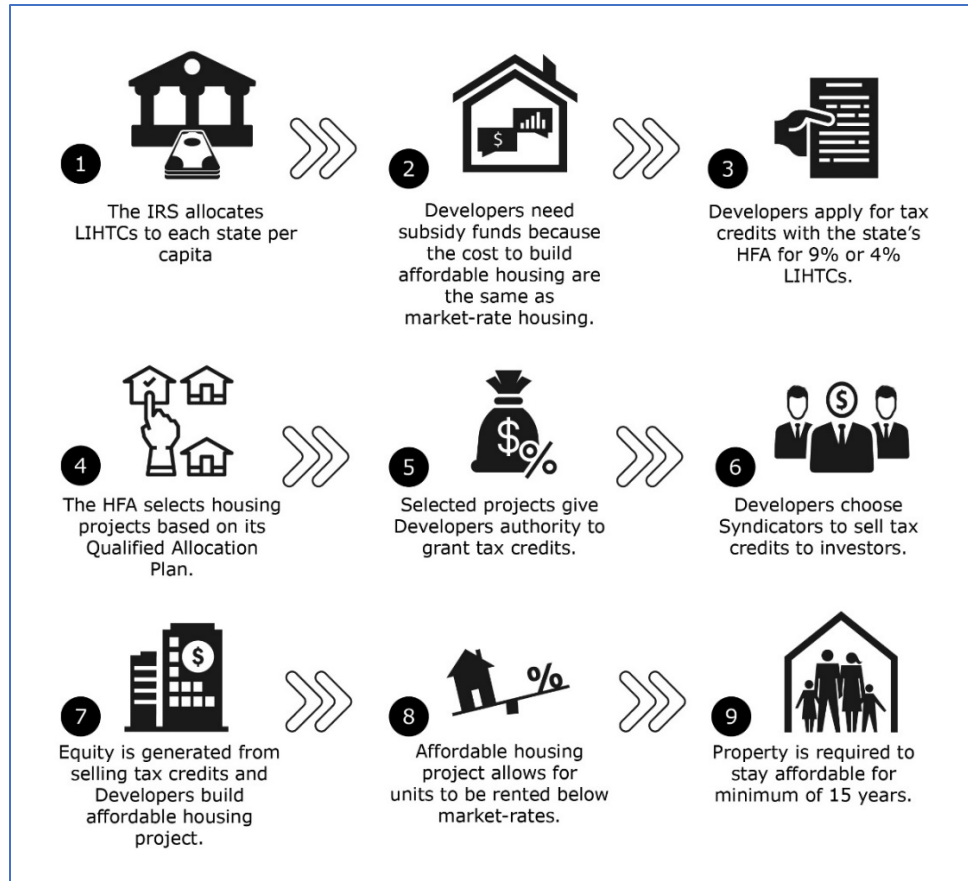


Figure 1: LIHTC Mechanism

Next, developers looking to build affordable housing require subsidy funds. The cost required to build low-income rental housing is the same to build market-rate housing. In a market-rate housing, the funds provided by higher rental costs can be leveraged for more finances. Therefore, developers must find ways to cover the lack of funds by looking for other sources of finance. LIHTC is one component by which developers can fill this financial gap. With lower financing cost, developers can offer more affordable rents in their proposed projects.

Third, the LIHTC program is managed by a local Housing Finance Agency (HFA) in every state. There are two main types of LIHTC programs of which developer may

apply to, 9%, which is quite competitive, and 4%, which is combined with state bond financing.<sup>17</sup>

## **9% and 4% Credits**

There are a few differences between the 9% and 4% credits. 9% credits are generally meant for new construction projects and 4% credits are typically used for rehabilitation projects or new construction which are financed with tax-exempt bonds. The numbers 4% and 9% were originally meant to correspond to the amount a project is qualified for tax credits for each year in 10 years. Historically, in previous projects this was not the case. In the Internal Revenue Code each of the tax credits correspond to their subsidy levels, where 4% credits corresponded to 30% subsidy level for present value of a project's qualified basis and 9% credits to 70% subsidy level of a project.<sup>18</sup> The 4% credit rate ranges between 3.15% and 3.97%, while the 9% credit ranges between 7.35% to 9.27% since 1986.<sup>19</sup>

The type of developers which apply to HFAs include joint ventures, partnerships, trusts, corporations, limited liability corporations, nonprofit organizations, and for-profit organizations. Projects that are eligible for LIHTC include apartment buildings, townhouses, duplexes, and single-family dwellings.

The HFA select, facilitate, and delegate any additional requirements for a developer to be eligible for tax credits based on a Qualified Allocation Plan (QAP). QAPs are made of federal requirements but are created by state housing agencies. Based on

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<sup>17</sup> "How the LIHTC Program Works." NHLP. April 27, 2018. Accessed April 02, 2019. <https://www.nhlp.org/resources/how-the-lihtc-program-works/>.

<sup>18</sup> Ibid.

<sup>19</sup> "Tax Credit Percentages 2018". *Novoco.Com*, 2018. <https://www.novoco.com/resource-centers/affordable-housing-tax-credits/data-tools/tax-credit-percentages-2018>.

federal law, QAPs must prioritize the selection of projects which serve the lowest income households and remain affordable for the longest period. For most states, there are two allocation periods per year.

## **Recent Changes to LIHTC**

There have been two recent changes to the LIHTC program, based on the 2018 Consolidated Appropriations Act. In the first change, the calculation for maximum income a LIHTC tenant was originally dependent on two threshold options of either 50% or 60% of the area median income. Now, property owners may average the income of all tenants and the total must not exceed 60% AMI. In the second change, the amount of credits available for each state was increased by 12.5% between 2018 and 2021.<sup>20</sup> This proves that LIHTC is constantly being updated in relation to the need for affordable housing in the United States. Any changes made by Congress on the LIHTC program must be reflected in current QAPs set forth by HFAs.

## **Translating Tax Credits into Equity**

In Figure 1 - steps 5 and 6, once a developer's project is chosen and allocated tax credits, they must go through a process of converting the tax credits into equity. The tax credits are usually claimed by taxpayers who are investors and not the developer. Developers typically go to a syndicator, an intermediary who administers tax credit deals with investors. Syndicators charge a fee for the oversight of the investment transactions. In the early days of the LIHTC program, syndicators played

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<sup>20</sup> Royce, and Edward R. "Text - H.R.1625 - 115th Congress (2017-2018): Consolidated Appropriations Act, 2018." Congress.gov. March 23, 2018. Accessed April 2, 2019. <https://www.congress.gov/bill/115th-congress/house-bill/1625/text>.

a large role in converting tax credits for equity, but in the later years, corporate investors involved with LIHTC grew, therefore diminishing the role of syndicators.

Investors involved with the project primarily look to offset their income tax liabilities. There must first be a limited partnership established between the investor and the developer. The developer usually has a small ownership percentage in the partnership but keeps the authority over running the project daily. The investor has a passive role in the partnership but maintains a large ownership percentage of the project. Provisions of the tax code are complex, and responsibilities are administered by a syndicator. The tax credits can only be claimed after the completion of the real estate development. Market price for tax credits fluctuate, and in normal economic conditions range between mid-\$0.80s to low-\$0.90s for every \$1.00 tax credit.<sup>21</sup> Investors capitalize on their investments when the difference between the market price of the credits and the face value (\$1.00) is high. In recent years, many investors include corporations, investing through private partnerships or investing directly.<sup>22</sup> Other investors include manufacturing firms, insurance, real estate, and utility. The second-most highly ranked purpose of investing is tax sheltering.<sup>23</sup>

In Figure 1, step 7, the equity generated from LIHTC helps finance a part of the project development. It is the responsibility of the developer to look for other sources of funding. Typically, in conjunction with equity produced through LIHTC,

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<sup>21</sup> Keightley, Mark P. "An Introduction to the Low-Income Housing Tax Credit." Congressional Research Service, February 12 (2013).

<sup>22</sup> Housingfinance.com. 2011. Accessed April 02, 2019.  
[https://www.housingfinance.com/news/corporate-investment-and-the-future-of-tax-credits-what-should-you-expect\\_o](https://www.housingfinance.com/news/corporate-investment-and-the-future-of-tax-credits-what-should-you-expect_o).

<sup>23</sup> Keightley, Mark P. "An Introduction to the Low-Income Housing Tax Credit." Congressional Research Service, February 12 (2013).

developers look to include conventional mortgage loans with grants provided by public or private sources.

Finally, in Figure 1, step 9, the projects are required to stay affordable for a minimum of 15 years. Each HFA and their QAPs vary but can delegate well beyond the 15-year minimum requirement for the affordability of a tax credit development.

### **Underwriting LIHTC and Development Cost**

LIHTC based equity is rarely enough to finance the development of a project. To make a project viable, developers are forced to include mortgage financing and additional sources of debt and equity. Through an adaptation of Schwartz's calculation, a hypothetical scenario to help explain the complexity of how a tax-credit development could be calculated is demonstrated in Table 1.<sup>24</sup> Based on assumptions of a 100-unit development where the total development cost (TDC) is just above \$12 million, this project would generate about \$8.4 million for 10 years in tax credits.

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<sup>24</sup> Schwartz, Alex F. *Housing Policy in the United States*. New York: Routledge, 2015.



<b>Assumptions</b>			
Total Units		100	
Cost per Unit	\$	125,000	
Total Development Cost (TDC)	\$	12,500,000	
Qualified Basis (84% of TDC)	\$	10,500,000	
Credit Rate		8.00%	
Annual Tax Credit	\$	840,000	
Total Tax Credit for 10 years	\$	8,400,000	
Median Family Income	\$	65,900	
<b>Financial Characteristics with Rents Set at Alternative Percentages of Median Family</b>			
% of Area Median Income	60%	50%	30%
Maximum Rent	\$ 989	\$ 824	\$ 494
Total Rent Roll	\$ 98,850	\$ 82,400	\$ 49,400
Gross Effective Income (5% Vacancy loss)	\$ 93,908	\$ 78,280	\$ 46,930
Total Maintenance and Operating Costs	\$ 37,563	\$ 31,312	\$ 16,426
Net Operating Income	\$ 56,345	\$ 46,968	\$ 30,505
Debt Coverage Ratio	1.15	1.15	1.15
Income Available for Debt Service	\$ 48,995	\$ 40,842	\$ 26,526
Maximum Mortgage (20 years, 7%)	\$ 5,820,014	\$ 5,060,882	\$ 3,289,573
<b>Gap Financing Required Under Alternative Scenarios</b>			
	<b>Price per Credit</b>		
	80 Cents	60 Cents	40 Cents
<b>Total Equity Received</b>	\$ 6,720,000	\$ 5,040,000	\$ 3,360,000
<b>Rents at 60% of Median</b>			
Equity + Mortgage	\$ 12,540,014	\$ 10,860,014	\$ 9,180,014
Gap Financing (TDC - Equity and Mortgage)	\$ (40,014)	\$ 1,639,986	\$ 3,319,986
<b>Rents at 50% Median</b>			
Equity + Mortgage	\$ 11,780,882	\$ 10,100,882	\$ 8,420,882
Gap Financing (TDC - Equity and Mortgage)	\$ 719,118	\$ 2,399,118	\$ 4,079,118
<b>Rents at 30% of Median</b>			
Equity + Mortgage	\$ 10,009,573	\$ 8,329,573	\$ 6,649,573
Gap Financing (TDC - Equity and Mortgage)	\$ 2,490,427	\$ 4,170,427	\$ 5,850,427

*Table 1 Hypothetical tax-credit financing calculation<sup>25</sup>*

In Table 1, three different scenarios based on the configuration of all units to target either 60%, 50%, or 30% area median income (AMI) for a price range per credit ranging from \$0.40 to \$0.80. Each scenario affects the eligibility of maximum mortgage financing, all based on 20-year mortgages with 7% interest rates. Also, in Table 1 the gap financing requirement for each scenario differs. In the scenario for all 60% AMI units at \$0.80 per tax credit, the equity from tax credits combined with the eligible maximum mortgage, the total development cost (TDC) of the project is exceeded by a little over \$40,000. But in most scenarios, when tax credits and

<sup>25</sup> Ibid.

maximum mortgage for a bank loan fall short to cover the TDC, the gap financing must be filled with other sources of funds such as soft second mortgages or grants.

## **Challenges and Unresolved Issues with LIHTC**

Although the LIHTC program has helped provide many affordable rental housing units in the nation, there are unresolved issues that developers must face. Table 1 did not include the cost for procuring land and that could account for a large part of the development cost. LIHTC can only cover a percentage of development costs, so the biggest challenge is for developers to cover the financial gap to make a project feasible. What's more, the LIHTC program has strict guidelines in its requirements and prevents the creation of mixed-income developments. The credits are only available for projects which target households with less than 60% of the area median income. This makes it more difficult for developers to add units which target households with higher than 60% AMI because such units would not be eligible for tax credits.

## **Other Sources of Government Funding**

LIHTC is one example of Congress encouraging developers to build more affordable housing. But as mentioned, this is not always a program which allows for enough funding for a project. Developers must seek out other available funds, starting with the first most viable alternatives within the public sector. Additional sources of funding include block grants, housing trust funds, foundations, and other nonprofit organizations which promote the development of affordable housing.

## **Block Grants**

The federal government allocates block grants to local and state governments and allows them flexibility to use the funds in how they see fit for community development and housing, considering some parameters in the mix. A consolidated plan (ConPlan) must be prepared to receive funds from programs administered by HUD that include the Community Development Block Grant (CDGB) program and the Home Investment Partnership Program. The ConPlan must show proof of state or municipality housing needs and have a five-year strategy for which the needs will be addressed. Furthermore, focus on resources and implementation must be specified in a one-year plan. Also, public participation must be implanted in the planning processes to include easily accessible relevant documents with public hearings for citizens to voice their concerns for the record.<sup>26</sup>

## **Community Development Block Grant (CDGB)**

Through the Housing and Community Development Act of 1974, the Community Development Block Grant (CDBG) was established to replace eight federal programs. This program is meant to be applied to a wide range of efforts which include acquisition, retention of real property, disposition, social services, and economic development. According to HUD, the CDGB, "works to ensure decent affordable housing, to provide services to the most vulnerable in our communities, and to create jobs through the expansion and retention of business."<sup>27</sup> There are a few inhibitions to what the CDBG can be used towards, which include public works like

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<sup>26</sup> Schwartz, Alex F. Housing Policy in the United States. New York: Routledge, 2015.

<sup>27</sup> "Community Development Block Grant Program - CDBG/U.S. Department Of Housing And Urban Development (HUD) | HUD.Gov / U.S. Department Of Housing And Urban Development (HUD)". Hud.Gov. Accessed 11 January 2019.  
[https://www.hud.gov/program\\_offices/comm\\_planning/communitydevelopment/programs](https://www.hud.gov/program_offices/comm_planning/communitydevelopment/programs).

government buildings, schools, airports, and general government facilities such as park maintenance, street repairs, and political activities.

Annual CDGB funds are provided to local governments and states based on a formula utilized by HUD. The formula is first divided into two separate community categories consisting of: entitlement and non-entitlement. Metropolitan cities with populations comprised of at least 50,000 and urban counties comprised of 200,000 both fall under the entitlement category. All other communities fall under the non-entitlement category. From the two categories, HUD compares all other metropolitan areas in a formula including the following measures: community need, population, extent of poverty, age of housing, house overcrowding, and population growth lag.

No less than 70 percent of CDBG funds must be used within either a 1, 2, or 3-year period, dependent on the grantee's selection, on activities which benefit low- and moderate-income people. The standard for CDGB to be used on low-income rental housing development is that the target units be under 80% AMI. This standard has been criticized because households that fall within this category are not the lowest income households which are most in need of housing.<sup>28</sup>

## **HOME Funding**

A second block grant was created by Congress in 1990, the HOME Investment Partnership program. HOME is the largest federal block program and focuses solely on affordable housing for low- and moderate-income households. The allocation of HOME funds is disbursed annually, 40% to states and 60% to cities and other local

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<sup>28</sup> Schwartz, Alex F. *Housing Policy in the United States*. New York: Routledge, 2015.

governments. From 1992 to 2012, a little over \$11 million of HOME funds supported the development of low-income rental housing. In large development projects, HOME funding cannot provide enough subsidies for the capital stack and must be combined with programs such as the LIHTC program.

## **Trust Funds**

Housing trust funds were first created in the 1970s and the number of funds have been growing at an exponential rate ever since. Between 2002 and 2013, a 100% increase of more than 525 trust funds were in operation. Trust funds have the most flexibility in their uses for addressing affordable housing needs and have fewer restrictions than block grant programs. The uses of these funds include new construction and acquisition of structures. Target uses are geared towards development projects which provide housing for individuals who fall under the 80% area median income.

The availability of these funds is often based on the amount of taxes that are imposed on real estate transactions.<sup>29</sup> Therefore, fluctuations in the real estate economy can directly influence the amount of trust funds available in each state.

Trust funds are utilized for items such as pre-development costs, administrative costs, and organizational capacity building. Last, trust funds rarely provide enough funding for large affordable housing projects and are usually combined with other sources of funding which include block grants and LIHTC.

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<sup>29</sup> Schwartz, Alex F. *Housing Policy in the United States*. New York: Routledge, 2015.

## **Foundations & Nonprofit Organizations**

States and local governments have set up many housing programs to provide funding to develop more affordable housing, but they rarely carry out initiatives directly.<sup>30</sup> Typically, they partner with foundations and nonprofit organizations to do so. Local governments are inclined to working with them over their for-profit counterparts because they share three common traits. The first trait is that they commit to keeping their housing projects affordable for low-income tenants indefinitely. Next, they not only aim to serve the poorest, most needy households, but provide supportive services such as child care, counseling, and education. Third, nonprofit organizations are sometimes the only groups who are willing and able to construct housing in tough urban neighborhoods.

To further exemplify their support, each state is required to assign at least 10% of its annual LIHTC to nonprofit development. Also, nonprofit organizations are split up into three main categories in how they operate: community development corporations, supportive housing for the homeless, and large citywide organizations.<sup>31</sup>

## **Private Sector Funding**

In addition to state and local government funds, private sector funding is also available for affordable housing. Since the enactment of the Community Reinvestment Act in 1977, advocates continually apply pressure on private financial institutions like banks to aid in the funding of affordable housing developments.<sup>32</sup>

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<sup>30</sup> Ibid.

<sup>31</sup> Ibid.

<sup>32</sup> "Community Reinvestment Act." Board of Governors of the Federal Reserve System, [www.federalreserve.gov/consumerscommunities/cra\\_about.htm](http://www.federalreserve.gov/consumerscommunities/cra_about.htm).

Three major entities which ensure banks throughout the nation are providing such opportunities to developers include the Federal Deposit Insurance Corporation, Federal Reserve Board, and the Office of the Comptroller of the Currency.

These private sources of funding charge market rates of interest, therefore increasing costs for project which include operating costs. Increasing operating costs result in fewer available units for low-income households.

## **Financing Mechanisms for Affordable Housing in Hawai'i**

In most cases, government subsidies are not enough to fill the capital stack, and developers must resort to private sector funding which are sourced through banks or financial institutions. In Hawai'i, the capital stack for developing affordable housing is different in every project. Due to the nature of high cost for development in general, developers typically start with amassing funds from government and state entities. The application process for government subsidies is extensive and often competitive. Also, philanthropy ventures may be included to make up for any gap financing.

### **Hawai'i's housing authority**

As mentioned in chapter 2, the facilitation of government funding is done through a housing finance agency. In Hawai'i, the Hawai'i Housing Authority (HHA) was first created in 1935 and has split up into two groups since then.<sup>33</sup> The first is the Hawai'i

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<sup>33</sup> "Agency History: A Timeline." Hawaii Housing Finance and Development Corporation, [dbedt.hawaii.gov/hhfdc/about/history\\_html/](http://dbedt.hawaii.gov/hhfdc/about/history_html/).

Public Housing Authority (HPHA), which manages federal and state housing programs such as Section 8 and senior housing. The second entity is in charge of developing and financing low-income housing projects, the Hawai'i Housing Finance and Development Corporation (HHFDC).

HHFDC provided funding for the development of about 5,500 units between 2010 and 2016.<sup>34</sup> Programs that HHFDC oversee include Low-Income Housing Tax Credits (LIHTC), Rental Housing Revolving Fund (RHRF), Hawai'i Rental Housing System Revenue Bonds (HRHSR), Hula Mae Multifamily Revenue Bonds, Home Investment Partnership Program (HOME) funds, and more. Each program has different limitations in funds available per year and extensive requirements.

### **LIHTC in Hawai'i**

In Hawai'i, there have been at least 34 projects put into service with the aid of LIHTC between 2010-2016.<sup>35</sup> These LIHTC projects provided about 3,200 units of affordable housing within a span of six years. Hawai'i Housing Finance and Development Corporation (HHFDC) is the responsible entity for administering available federal and state credits. Within the fiscal year of 2014 about \$3.3 million in federal and \$1.6 million in state credits were made available.<sup>36</sup>

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<sup>34</sup> Hawaii Institute for Public Affairs Land Use Research Foundation, and Hawaii Housing Finance and Development Corporation. "Housing Action Plan Final Report to the Hawaii State Legislature." Hawaii.gov, Dec. 2017, [dbedt.hawaii.gov/hhfdc/files/2018/01/HI-Housing-Action-Plan-Final-12.26.2017.pdf](https://dbedt.hawaii.gov/hhfdc/files/2018/01/HI-Housing-Action-Plan-Final-12.26.2017.pdf).

<sup>35</sup> "LIHTC Database Access." LIHTC Database Access. Accessed April 2, 2019. <https://lihtc.huduser.gov/>.

<sup>36</sup> "2014 Annual Report: Hawaii Housing Finance and Development Corporation." Hawaii.gov. 2014. Accessed April 2, 2019. <https://dbedt.hawaii.gov/hhfdc/files/2015/01/HHFDC-2014-AR-FINAL.pdf>.



Based on HHFDC's selection process, tax credits were allocated towards projects which were most eligible. The eligibility process is decided through an extensive Qualified Allocation Plan (QAP), which HHFDC updates every year. Appendix A provides detailed information of what type of requirements must be met in the most current 2018/2019 QAP.

After developers apply for tax credits, HHFDC compares all applications that have been received and ranks them according to a point system provided in the QAP which include criteria such as development team experience, financial condition, related developments, development and operating budgets, and market conditions. An example of a project that is most eligible for tax credits in Hawai'i is calculated within Appendix D and will be explained in chapter 9.

## **Rental Housing Revolving Fund (RHRF)**

The Rental Housing Trust Fund (RHRF) are low-interest loans or grants that are available for the construction of affordable housing. RHRF may be used for planning, design costs, land acquisition, down payments, equity financing, or other services provided in the Consolidated Application of HHFDC.<sup>37</sup> A requirement of the RHRF is at least 5% of the total number of units in a project must be allocated to households with 30% AMI or less. Outstanding commitments of about \$52 million and a cash balance of about \$75 million was recorded as of June 2014.<sup>38</sup>

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<sup>37</sup> Hawaii Institute for Public Affairs Land Use Research Foundation, and Hawaii Housing Finance and Development Corporation. "Housing Action Plan Final Report to the Hawaii State Legislature." Hawaii.gov, Dec. 2017, [dbedt.hawaii.gov/hhfdc/files/2018/01/HI-Housing-Action-Plan-Final-12.26.2017.pdf](https://dbedt.hawaii.gov/hhfdc/files/2018/01/HI-Housing-Action-Plan-Final-12.26.2017.pdf).

<sup>38</sup> "2014 Annual Report: Hawaii Housing Finance and Development Corporation." Hawaii.gov. 2014. Accessed April 2, 2019. <https://dbedt.hawaii.gov/hhfdc/files/2015/01/HHFDC-2014-AR-FINAL.pdf>.

## **Hawai'i Rental Housing System Revenue (HRHSR) Bonds**

The Hawai'i Rental Housing System Revenue (HRHSR) bond program was developed to help address the shortage of available rental housing opportunities in Hawai'i.

HRHSR provides tax-exempt bond financing for affordable rental projects owned by HHFDC. The bond authority amounted to \$375 million, of which \$97 million was available in 2014.<sup>39</sup>

## **Hula Mae Multi-Family Revenue Bonds**

The Hula Mae Multi-Family Bond program helps to provide low interest financing through the issuance of tax-exempt revenue bonds. These bonds may be used towards the construction of rental housing projects. If qualified, developers can secure 4% tax credits with the issuance of these bonds. HHFDC, coupled with the consent of the Governor of Hawai'i is authorized to issue up to \$1 billion in revenue bonds.<sup>40</sup>

## **HOME Funds**

Home Investment Partnerships Program (HOME) funding is intended to supply decent, safe, sanitary, and affordable housing in Hawai'i. There are many uses for these funds which include rental assistance, property acquisition, new construction, site improvements, and other expenses related to developing affordable housing. About \$3 million in HOME funds are made available by HHFDC and rotate their allocation to the counties of Hawai'i, Kauai, and Maui.<sup>41</sup> The HOME program must be used to develop units that target households who fall under the 80% or below AMI range.

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<sup>39</sup> Ibid.

<sup>40</sup> Ibid.

<sup>41</sup> Ibid.

## **Community Development Block Grants (CDBG)**

As previously mentioned, CDBG is available to develop housing in order to benefit low income households. The available funds for states and local jurisdictions are based on a formula administered by HUD related to the community need, population, and extent of poverty. CDGB is not administered by HHFDC, instead, the separate counties of Hawai'i administer these funds.

## **Private Sector Funding**

Formerly mentioned, private sector funding is available in aiding the support of affordable housing development. In Hawai'i, sources of funding include banks such as Central Pacific Bank, City Bank, Finance Factors, and First Hawaiian Bank. They all provide loans for construction and charge market rate interest on loans. The current average interest rate for construction loans range between 5% and 7%.

## **Summary**

There are many sources of funding for the development of affordable housing in Hawai'i. However, the programs created to provide government subsidies do not last forever. One example is the CDGB, which replaced eight other federal programs in its inception. Another example is the Rental Assistance Revolving Fund (RARF). Initially, the RARF program was created to provide construction loans at below market interest rates but was eventually assimilated into the RHRF program in 2016.<sup>42</sup>

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<sup>42</sup> Hawaii Institute for Public Affairs Land Use Research Foundation, and Hawaii Housing Finance and Development Corporation. "Housing Action Plan Final Report to the Hawaii State Legislature." Hawaii.gov, Dec. 2017, dbedt.hawaii.gov/hhfdc/files/2018/01/HI-Housing-Action-Plan-Final-12.26.2017.pdf.

Changes are inevitable for systems within the government, due to changes in market fluctuation for the development of affordable housing. With the flexibility of amassing funds, developers can seek alternative sources. In some cases, affluent individuals with interest in projects could be an option, but accessibility to such groups is not common. Appendix D provides an example of philanthropy efforts that were made to provide funding in the capital stack. Up to \$3 million was attained but took years to fundraise. Therefore, a substitute to such a method could be crowdfunding. An advantage of crowdfunding is that funds can be raised in a short amount of time. One example is a campaign initiated by Kevin Cavanaugh from Gurella Development in Oregon, who was able to raise \$300,000 in less than 72 hours. The funds were used toward developing 2 market-rate lofts, retail space, and 11 single resident occupancy rooms.<sup>43</sup> Crowdfunding will be further discussed in detail in the next segments of this research.

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<sup>43</sup> "Guerrilla Development Launches Second Crowdfunding Campaign." Architect & Developer. February 14, 2018. Accessed April 02, 2019. <http://architectanddeveloper.com/guerrilla-development-launches-second-crowdfunding-campaign/>.

## Chapter 3: What is Crowdfunding?

Crowdfunding could become a tool used to lessen issues of nimbyism in the world of real estate development. Architects and developers who use equity-based crowdfunding efforts in their projects allow public engagement with not only financial support but also increases awareness for future projects. Increasing awareness could become a step towards decreasing the opposition, by surrounding communities, of a development before construction even begins.

Crowdfunding is a means of amassing funding online, typically from many individuals. Individuals seeking funds are denoted by different terms on different platforms. However, for this thesis, individuals or organizations seeking funding will be referred to as creators. Creators seek to raise funds for ventures which range from developing a video game, designing a new cellphone case, to developing real estate. The funds or pledges are contributed either by family, friends, and or individual investors known as backers. This mainstream approach for business finance allows creators to tap into the power of the internet – through online social media websites and or crowdfunding platforms – helping to eliminate boundaries of distance between backers and creators by expanding needed networks in support of their campaign goals.

Starting a business or launching a product is difficult without the proper amount of capital. Typically, one would need to set up a business place, do market research, prototype the idea, then pitch it to a limited group of wealthy individuals or institutions to begin. If not planned properly for any business campaign, failure would result in lots of time and money lost.

Crowdfunding platforms allow entrepreneurs to present their ideas in front of a large audience and interested parties. With enough support, entrepreneurs can leverage available funds to get started on goals that traditional methods would not allow. One example is rehabilitation of a thousand homes devastated by a natural disaster.

There are three major types of crowdfunding: reward-based crowdfunding, donation-based crowdfunding, and equity-based crowdfunding. Equity-based crowdfunding is most suitable for affordable housing because it allows backers to feel a humane satisfaction of helping others in need and receive monetary gain at the same time - this would be a win-win situation for everyone.

## **Reward-based Crowdfunding**

First, reward-based crowdfunding allows backers to contribute to a business campaign in exchange for a reward. In most cases, backers need an incentive for contributing to a cause. Depending on the pledge amount contributed to a campaign, rewards differ in the form of products or services.

### **Start the Music**

The act of collecting small contributions through an online funding platform - ArtistShare was launched in 2003 by a Boston musician and computer programmer named Brian Camelio.<sup>44</sup> The very first reward-based crowdfunding venture began through a jazz composer named Maria Schneider, whose album "Concert in a Garden" was featured on ArtistShare. The system of reward tiers were based on the contribution amount that a backer would provide. In this campaign, from a

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<sup>44</sup> Freedman, David M., and Matthew R. Nutting. A Brief History Of Crowdfunding. Ebook, 2015. <http://freedman-chicago.com/ec4i/History-of-Crowdfunding.pdf>.

contribution of \$9.95 - fans were able to become the first to download the album. Backers who gave \$250 or more were listed in the back of the album, and a fan who contributed \$10,000 was given the honor of being listed as executive producer.<sup>45</sup> Schneider's campaign raised \$130,000 and enabled her to compose, produce, and market the album in 2004, which later won a Grammy Award for best large ensemble album in 2005.

ArtistShare evolved, from originally seeking donations from fans to help artists produce digital recordings to becoming a successful fundraising platform for photography, film, and music. From the success of ArtistShare, other reward-based crowdfunding platforms emerged, which include Indiegogo in 2008 and Kickstarter in 2009.<sup>46</sup> Kickstarter usually attracts the market of creators and backers from within the U.S., while Indiegogo attract the market of supporters on a global scale. There are two types of models for each platform in reward-based crowdfunding. One is the All-Or-Nothing model where creators set a crowdfunding goal, and if the goal is not met in the set amount of time, all pledges are returned to the backers. Second is the Keep-It-All model, where the pledges are kept by the creators, whether the crowdfunding goal is met or not.

Indiegogo and Kickstarter are two of the earliest crowdfunding platforms and are still used today. These platforms will be discussed in detail in the next section of this research.

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<sup>45</sup> Ibid.

<sup>46</sup> Ibid.

## **Indiegogo.**

Indiegogo was launched in 2008, offering creators to start online reward-based crowdfunding campaigns in three categories of creative, innovative, or social.<sup>47</sup>

Individuals, groups of people, businesses that are registered, nonprofit institutions, communities, and political, or religious organizations can start ventures on Indiegogo. Creators can be in any country of the world and this platform is offered in several languages including English, German, French, and Spanish.

In Indiegogo, creators can choose to start ventures between the two models of All-Or-Nothing and Keep-It-All. The minimum crowdfunding goal must be set at 500 USD/EUR/CAD/AUD/GDP on this platform.

## **Kickstarter**

Kickstarter was first launched in 2009. Through to 2015, Kickstarter hosted more than 265,000 funding campaigns and 36 percent were successful. The most successful campaigns included music, art, film, and design.

The creators in Kickstarter have full ownership of their intellectual property. Backers are given rewards, based on their contribution to each venture, but do not become owners nor do they receive monetary gain. Some examples of rewards include concert tickets to the creator's live performance, dinner with the creator, or products that have yet to be sold to the public.

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<sup>47</sup> Cumming, Douglas J., Gael Leboeuf, and Armin Schwenbacher. Crowdfunding Models: Keep-It-All Vs. All-Or-Nothing. Ebook, 2015.  
[https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2447567](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2447567).



Kickstarter only allows creators to use the All-Or-Nothing model.<sup>48</sup> Each creator sets a crowdfunding goal amount and the duration of the campaign. Projects on Kickstarter last anywhere between one to sixty days. Based on research done by Kickstarter, the recommended duration for campaigns are thirty days or less. Furthermore, Kickstarter claim that campaigns have higher success rates with shorter durations.<sup>49</sup> Shorter campaigns help build a sense of urgency for backers to assist in reaching the crowdfunding goal.

## **Donation-based Crowdfunding**

Second, as opposed to the other crowdfunding models, in the donation-based model individual contributions are not motivated by a pursuit of tangible returns. Therefore, the success of such crowdfunding campaigns is based solely on the crowd's emotional connection to the creator's purpose. Common reasons for contributions include supporting medical expenses for an individual, religious campaigns, and community projects that would normally require governmental funding. Based on a study done by Massolution in 2012, within the aggregate of \$1.5 billion, attained through different crowdfunding models, donation-based crowdfunding accounted for almost half of the total.<sup>50</sup> As a result from Massolution's study, donation-based crowdfunding was the most commonly used method to amass funds.

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<sup>48</sup> Gerber, Elizabeth M., Julie S. Hui, and Pei-Yi Kuo. Crowdfunding: Why People Are Motivated To Post And Fund Projects On Crowdfunding Platforms. Ebook, 2012. <https://pdfs.semanticscholar.org/c1e2/a1068f0af1c3120c62be5943340518860ecb.pdf>.

<sup>49</sup> "What Is the Maximum Project Duration?" Kickstarter Support. January 2019. Accessed February 23, 2019. <https://help.kickstarter.com/hc/en-us/articles/115005128434-What-is-the-maximum-project-duration->.

<sup>50</sup> Massolution. "Crowdfunding Architecture." Neofundproject. January 2013. Accessed April 2, 2019. <https://neofundproject.files.wordpress.com/2014/09/crowdfunding-architecture.pdf>.

Donation-based crowdfunding requires an effective communication strategy to convey the creator's intentions for the funds received. A key component for the campaign to become successful through donation-based crowdfunding is that the backers must identify or have an emotional connection. Also, the crowd must be notified of why no other means of funding the project is available.<sup>51</sup> Last, it is important for backers to circulate the existence of crowdfunding campaigns to other likeminded potential backers. In doing so, will increase the chances of attaining crowdfunding goals.

### **Donation-based crowdfunding platforms**

There are many donation-based crowdfunding platforms, in addition to Kickstarter and Indiegogo. Other platforms include Causes, Chuffed, Classy and Fundly. They all have several common traits including gearing campaigns for nonprofit organizations, quick access to social network sites like Facebook, and have apps which are easily accessed via smartphone to help advertise the project. Depending on the platform, some charge a small percentage fee per donation received or allowing for free use. Each platform has different rules, regulations, benefits, and downsides to them. A platform called Basics For Blokes is free to use and allows creators to keep all donations. Basics for Blokes was designed to be easy to use for individuals who are new to crowdfunding but is not necessarily the site which attracts the most traffic of potential backers.

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<sup>51</sup> Ibid.

## Equity-based Crowdfunding

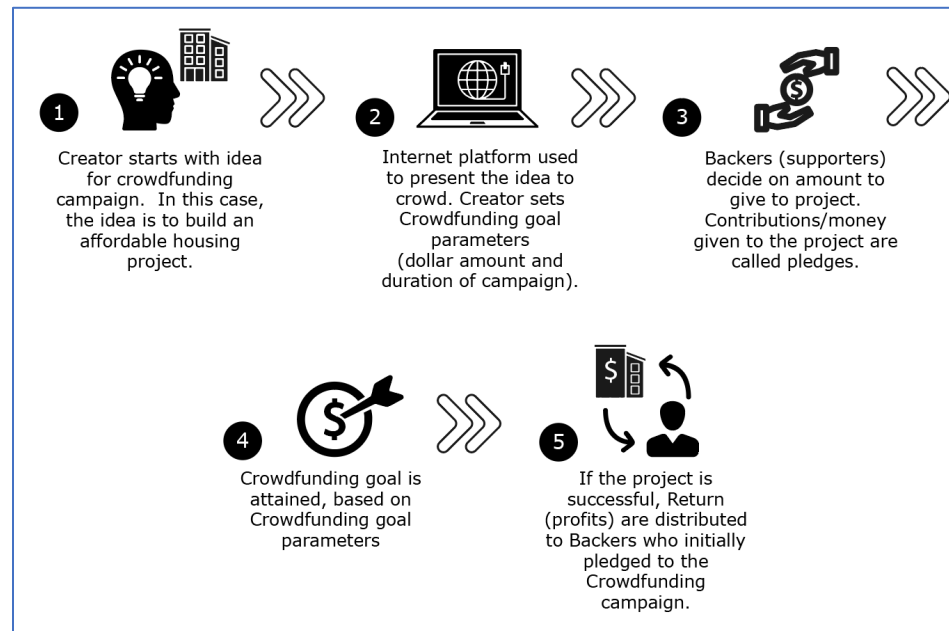
Third, equity-based crowdfunding allows people to invest small amounts of money, also known as pledges, to help raise capital for businesses or real estate in hopes of getting a return. The concept of equity-based crowdfunding was first established within the Jumpstart Our Business Startups (JOBS) Act in 2012. The Securities and Exchange Commission (SEC) created regulations for Small and Medium-sized Businesses (SMB) to raise capital by minimizing hurdles to provide returns for investors. In the beginning, only accredited investors, those who have a net worth of at least \$1,000,000 or an income of at least \$200,000 each year for the last two years, could contribute to equity-based crowdfunding. Later in 2011, The Entrepreneur Access to Capital Act was passed by the US House of Representatives to help encourage crowdfunding ventures.<sup>52</sup> This clearly showed the interest of the U.S. government to support crowdfunding as a component for economic growth. Furthermore, in 2016, the Title III rules were established by the SEC, permitting anyone, even non-accredited investors to access crowdfunding platforms and invest into new businesses.<sup>53</sup>

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<sup>52</sup> McHenry, and Patrick T. "H.R.2930 - 112th Congress (2011-2012): Entrepreneur Access to Capital Act." Congress.gov. December 01, 2011. Accessed April 02, 2019. <https://www.congress.gov/bill/112th-congress/house-bill/2930>.

<sup>53</sup> "SEC Adopts Rules to Permit Crowdfunding." U.S. SEC. October 30, 2015. Accessed February 22, 2019. <https://www.sec.gov/news/pressrelease/2015-249.html>.

## The mechanism of Equity-based Crowdfunding



*Figure 2. Equity-based Crowdfunding Affordable Housing*

The steps of equity-based crowdfunding an affordable housing project is described in Figure 2, through five steps. First, the creator, in this case a developer begins with an idea to start a crowdfunding campaign to build an affordable housing project. The creator then goes to an internet-based platform to post the idea. Popular platforms include Indiegogo, Kickstarter, and Fundrise. Within this platform the parameters of the crowdfunding campaign are set, regarding crowdfunding goal, or dollar amount needed for the project and the duration of the campaign. In step 3, supporters, also known as backers, decide on the amount to contribute to the crowdfunding campaign. These contributions, or pledges can vary, depending on the cause. Pledges are initial investments that backers provide. If the crowdfunding goal is met within the duration set for the crowdfunding campaign, the project is initiated. Lastly, after the completion of the affordable housing project, returns in the

investments are distributed to backers, accordingly to how much they initially invested into the project.

## Protection for the Backers

Within a system that allows for money to be transferred over the internet, fraud becomes a concern for first-time backers. In 2013, an assistant professor at the Wharton School, University of Pennsylvania named Ethan Mollick did a study on 48,500 Kickstarter projects. From his research, Mollick discovered, "less than 1 percent of the funds in crowdfunding technology and product design go to projects that seem to have little intention of delivering their results."<sup>54</sup> His study covered one type of fraud, "take the money and run."

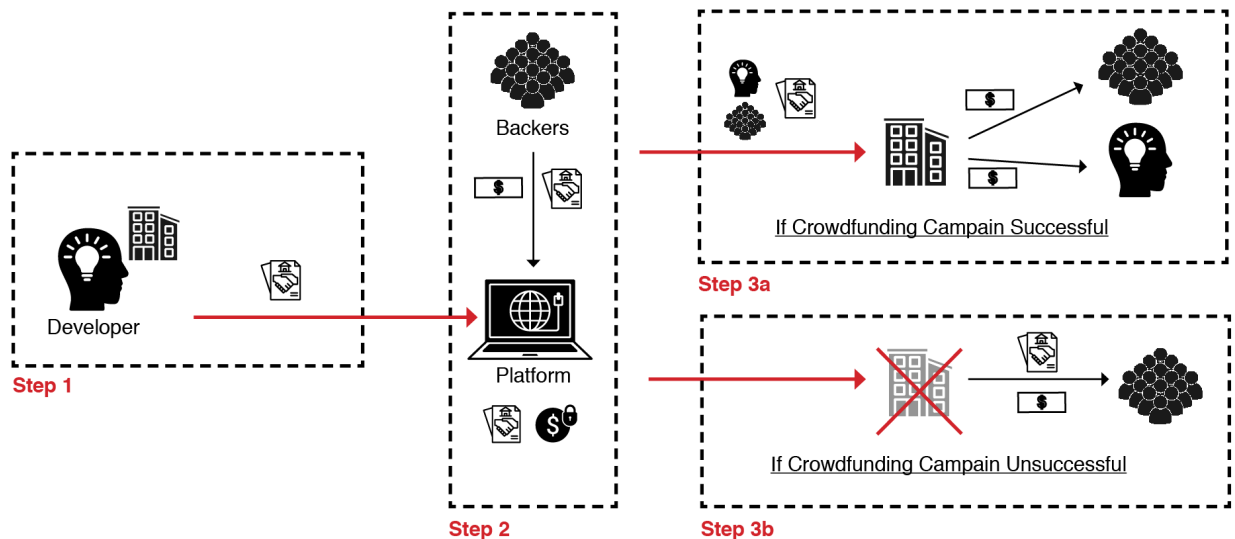


Figure 3. Protection protocol for backers

Questions on protection against scams and possible fraud may be raised in equity-based crowdfunding for the development of an affordable housing project. Figure 3

<sup>54</sup> Mollick, Ethan. "The Dynamics of Crowdfunding: An Exploratory Study." *Journal of Business Venturing*. August 13, 2013. Accessed March 24, 2019. <https://www.sciencedirect.com/science/article/pii/S088390261300058X?via=ihub>.

shows three steps in mitigating the possibility of such unfortunate events to protect backers' money.

In step 1, after the developer has established a capital stack comprised of bank loans, LIHTC, grants, and trusts, the developer will seek to fill a portion of the gap financing with equity-based crowdfunding. From there, the developer goes to a reliable platform to post their idea to develop affordable housing, explaining how crowdfunding may help fill the necessary gap financing for the project. There must be an agreement set forth within the platform that the developer is required to return all pledges to backers if the crowdfunding goal is not met within the duration of the campaign. This agreement is modeled after the All-Or-Nothing method which exists on platforms such as Indiegogo and Kickstarter. GoFundMe provides a great example of a set agreement in their *GoFundMe Guarantee Policy*. In their policy, GoFundMe guarantees the protection of backers' pledges in the case that they are not delivered to their stated purpose of use.<sup>55</sup>

In step 2, the internet-based platform which the developer chooses will act as the medium to connect the developer and potential backers for the crowdfunding campaign to develop affordable housing. If people choose to contribute to the project, they must agree to terms for their money be returned to them in the case that the crowdfunding goal is not attained within the duration of the campaign.

An important component of the platform is to keep the pledges, provided by backers, safe in a secure account that the developer cannot access until the crowdfunding goal is met. Due to the nature of the medium's connection to the internet, security

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<sup>55</sup> "The GoFundMe Guarantee Policy." GoFundMe. Accessed April 2, 2019. <https://pages.gofundme.com/guarantee-policy/>.

measures must be built in to prevent hacking of backers' funds. What's more, according to Kickstarter, their recommendation of a crowdfunding campaign of thirty days or less has higher success rates because it is helpful to create a sense of urgency towards the completion of the project.<sup>56</sup>

In figure 3, step 3 is separated into two parts, depending on the succession of the crowdfunding campaign. Step 3a exemplifies crowdfunding campaign for an affordable housing project where the goal has been met. Based on the agreement between the developer and the backers in steps 1 and 2, the pledges are disbursed to the developer for the stated purpose of filling a financial gap in funding the construction of an affordable housing project. When the project is completed, a portion of the income produced by the project will provide returns to the backers and the developer. Step 3b describes the result if the crowdfunding goal is not met within the duration set forth by the developer. In this case, all pledges provided by backers will be returned to those who contributed to the campaign.

### **Equity-based crowdfunding platforms**

There are many available equity-based crowdfunding platforms. Since the JOBS Act allowed for investment in crowdfunding, platforms such as Wefunder, Localstake, PeerRealty, Fundrise, and CircleUp have gained popularity for investors. The campaigns vary on each platform including startup technology companies researching prosthetics limbs, a company which provides a monthly subscription to socks, development of an app for finance management, and real estate development. Depending on the platform, backers can either make pledges based

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<sup>56</sup> "What Is the Maximum Project Duration?" Kickstarter Support. January 2019. Accessed February 23, 2019. <https://help.kickstarter.com/hc/en-us/articles/115005128434-What-is-the-maximum-project-duration->.

on a binding agreement over a specified period or a non-binding agreement. Some platforms operate by applying pledges toward shares over multiple companies, while other platforms like Fundrise, pledges are placed into an asset portfolio which encompass multiple projects as a single investment.

## **Restrictions to equity-based crowdfunding**

The restrictions for equity-based crowdfunding is based on the JOBS Act and Regulation A+. Regulation A+ includes two tiers differentiating on the total amount of money each company can raise within 12 months.<sup>57</sup> Tier one allows for companies to raise up to \$20 million in a 12-month period, while tier two limits companies to \$50 million within the same length of time. Both tiers have bottom line requirements for eligibility such as disclosure of investments to the SEC, not having a history of being convicted of securities fraud, and other matters. The main difference between the two tiers is that tier two includes limitations on the pledge amount by non-accredited investors.<sup>58</sup>

## **Summary**

There are many differences between the three crowdfunding models discussed. They each have advantages and limitations that creators should understand in order to choose the right model for each project. After explaining the advantages and disadvantages, a segment of how crowdfunding is applied towards the world of architecture. Architects can tap into the potential of crowdfunding and the built

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<sup>57</sup> "Top 10 Equity Crowdfunding Sites for Investors & Entrepreneurs." Money Crashers. August 30, 2018. Accessed April 2, 2019. <https://www.moneycrashers.com/equity-crowdfunding-sites-investors-entrepreneurs/>.

<sup>58</sup> "Regulation A." U.S. SEC. May 04, 2017. Accessed April 2, 2019. <https://www.sec.gov/smallbusiness/exemptofferings/rega>.



environment by engaging the public to help support their ideas for a development that will benefit the community.

## **Advantages**

Reward-based crowdfunding provides incentive for backers to support campaigns by giving them something in return for their contributions. Depending on the campaign, some reward-based crowdfunding campaigns allow for people to receive products before they are available on the market. Donation-based crowdfunding is best utilized in times of need such as post natural disaster efforts. The satisfaction of supporting a good cause can be fulfilled in this situation. An advantage for equity-based crowdfunding allows for any middle-class citizen to invest into business ventures, no matter how small they are.

## **Limitations**

Limitations in each crowdfunding model must be identified to understand which is best suited for the type of business venture a creator is looking to fund. Based on Cumming's research, the All-Or-Nothing campaigns are more likely to be successful than Keep-It-All campaigns.<sup>59</sup> The risk is higher for creators in All-Or-Nothing campaigns if they are not funded, therefore the incentive to provide a higher quality of information for supporters is increased. The level of information provided to potential backers must be clear and concise to evoke connection and support towards the crowdfunding campaign.

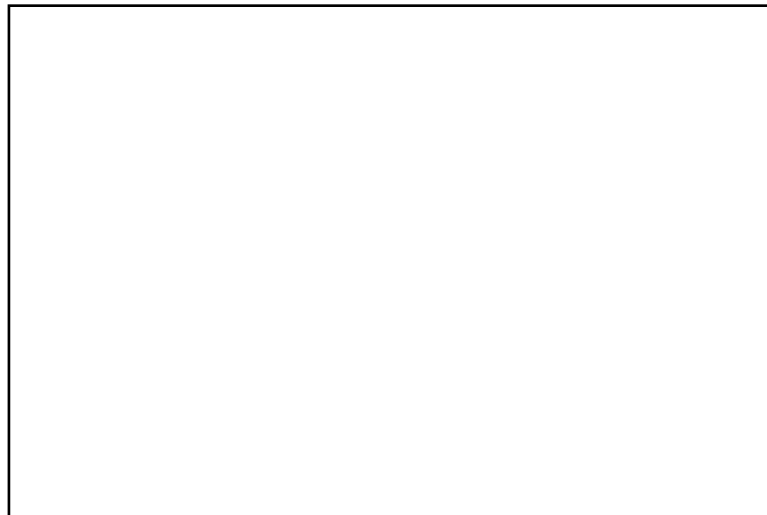
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<sup>59</sup> Cumming, Douglas J., Gael Leboeuf, and Armin Schwenbacher. Crowdfunding Models: Keep-It-All Vs. All-Or-Nothing. Ebook, 2015.  
[https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2447567](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2447567).

## Crowdfunding in Architecture

The use of crowdfunding in architectural projects around the world has been increasing throughout the recent years. In most projects, architects have limited involvement in financing construction projects. Crowdfunding gives architects more opportunities to become fully integrated in the development process. Architects can engage the public, take control of the business aspects for development, and market their work through crowdfunding. Crowdfunding could become a useful tool in marketing future development to help increase awareness for surrounding communities. This is especially important in Hawai'i because nimbyism is common, where locals are against many new developments that occur in this island state.

Many successfully funded campaigns include projects which benefit the surrounding community. One example that benefited the community is the I Make Rotterdam Project.



*Figure 4: I Make Rotterdam Project<sup>60</sup>*

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<sup>60</sup> Lisa, Ana. "Rotterdam Citizens Crowdfund Fantastic Wooden Luchtsingel Footbridge." Inhabitat Green Design Innovation Architecture Green Building. March 25, 2013. Accessed April 2, 2019. <https://inhabitat.com/rotterdams-wooden-luchtsingel-footbridge-is-a-fantastic-piece-of-crowdfunding-architecture/>.

Figure 4 shows the I Make Rotterdam Project located in Rotterdam, Netherlands. The city was overrun by vehicular circulation and inhibited the pedestrians to traverse through the environment by foot. The need for a pedestrian bridge throughout the cityscape was enough to inspire enough people to contribute towards a crowdfunding campaign of \$1 million. The crowdfunding campaign helped increase publicity and support to win the Stadsinitiatief 2012 award and \$4 million to finish the project in 2015.<sup>61</sup> Overall, the main reason for such a successful crowdfunding campaign was based on the engagement of the local community's empathy.

The potential for the uses of crowdfunding is not limited to community-based projects. A company called Fundrise, was founded on using crowdfunding as their business model.

## **Fundrise**

Fundrise is a crowdfunding platform based solely on real estate development within the United States. Projects include commercial renovation, single-family home renovation, construction of luxury apartments, and other types of development.

Fundrise is an equity-based crowdfunding platform which keeps its operations within the Regulation A+ regulations while streamlining the process for anyone to invest in multiple projects through a single investment portfolio. Their website boasts a return rate of up to 12% of investments made to their available portfolio tiers.

Fundrise is comprised of specialists who must strategically search for potential developments, software engineers who ensure seamless use and security for online transactions, and specialists who are adept in investment laws. Also, Fundrise helps

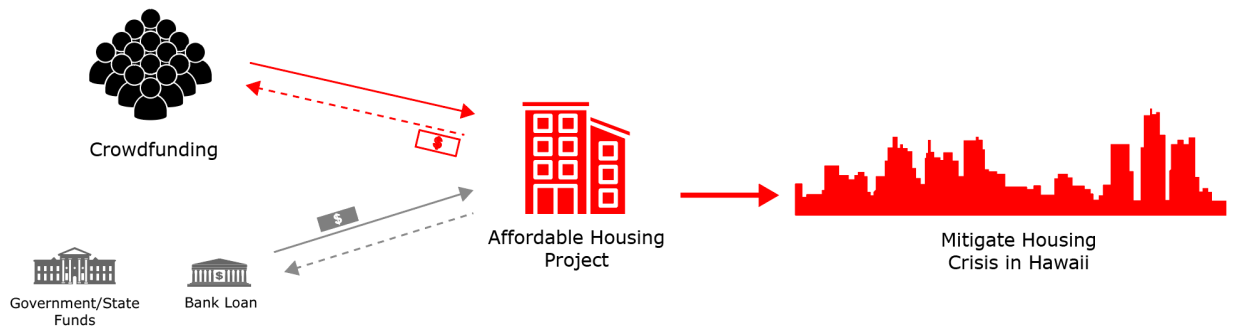
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<sup>61</sup> Petty, James. "Crowdfunding Architecture." Architect & Developer. January 25, 2019. Accessed April 02, 2019. <http://architectanddeveloper.com/crowdfunding-architecture/>.

develop multiple construction projects simultaneously, but there is no real effort in providing affordable housing.

Attempts to implement crowdfunding into affordable housing exists, but there is no suitable platform, nor a clearly established model which develop affordable housing by means of crowdfunding throughout the United States. Throughout the next sections, this subject will be discussed in detail.

## Chapter 4: Developing Affordable Housing with Crowdfunding



*Figure 5. Crowdfunding logic*

Figure 5 provides a quick glimpse of the logic for developing affordable housing in Hawai'i through equity-based crowdfunding. Crowdfunding provides an opportunity for non-accredited, middle-class citizens to contribute in the development for affordable housing. This is important to help create a sense of social buy-in and increase closed loop economic circulation within Hawai'i. Funds produced by a development does not always have to return to investors back on the U.S. mainland, and can be returned to locals in Hawai'i. Due to the nature of crowdfunding, and the high cost of multifamily housing development, excessive capital such as government subsidies and other sources of finances like bank loans must be combined to fill the capital stack.

Crowdfunding could support social involvement in helping to address the housing crisis in Hawai'i. What's more, crowdfunding lets affluent members of society and middle-class citizens potentially work together by providing funds to help those in need of low-cost affordable housing. This helps generate awareness of planned

affordable housing projects which incorporate crowdfunding. If the locals of Hawai'i contribute to such projects, they may gain a sense of ownership. With a sense of ownership comes concern with the issue of the housing shortage issue. If enough people contribute to an affordable housing crowdfunding campaign, this could spark a level of empathy for more individuals to join and support the cause. In having more participation to address the need for affordable housing, the closer it will be to mitigating the housing shortage issue in Hawai'i.

Developing affordable housing with crowdfunding requires a willing and able developer. Such an effort would best be executed by an architect-developer who are more likely to be highly creative individuals. Part 2 will explain why an architect-developer is an ideal candidate to lead such an effort.

## ***Part 2: Architect as a Developer***

## **Chapter 5: Architect and Developer Relationships**

The focus of this segment is to identify the relationships between architects and developers. There is typically a disconnect between these two entities which need to be alleviated because combining the role of architect and developer would increase efficiency in project cost and encourage high-quality design. A well-designed affordable housing project will increase livability for its end user.

There are many models that have evolved over time in the construction industry which guide connections between one another regarding contracts and operations. Two major types that will be discussed are the design-bid-build model, and the design-build model. From there, a method of connection between the architect and developer will be proposed.

### **Design-Bid-Build**

First, the design-bid-build model is widely used by developers, architects, and contractors but is limited because the developer assumes all risk for the completeness of the design, even if the design is contracted to an architect. Design-bid-build is based on the following sequence for development: design, construction documents, bidding, and construction. Figure 6 shows the contractual and operational relationships between the three entities of developer, architect, and contractor. In this traditional method the developer must contract the other two entities separately. The architect produces construction documents for the project, and the contractor physically builds the project.





Figure 6. Adapted diagram of Design-bid-build<sup>62</sup>

Contractually, each entity is separated independently from one another. Therefore, the contractor and architect have no contractual obligation to one another, nor are they required to work together from the beginning of the project. The developer must manage two separate contracts between the contractor and architect.

Operationally, there is a linear relationship between the three entities. The architect must answer any questions brought upon by the contractor and consults any changes to construction which affect additional costs to the development. These additional costs may be incurred by the developer. Therefore, the architect is responsible for being the arbitrator between the developer and the contractor. The developer typically assumes all risks brought upon by the completeness of the documents for design.

## Design-Build

On the other hand, design-build is arguably the most popular method used for construction in the nation.<sup>63</sup> Figure 7 exemplifies the contractual and operational relationship between the developer, architect, and contractor.

<sup>62</sup> Abdou, Ossama A. "Managing Construction Risks." *Journal of Architectural Engineering* 2, no. 1 (1996): 3-10. Accessed January 22, 2019. doi:10.1061/(asce)1076-0431(1996)2:1(3).

<sup>63</sup> "What Is Design-Build? – DBIA." DBIA. Accessed March 25, 2019. <https://dbia.org/what-is-design-build/>.



Figure 7. Adapted diagram of Design-build<sup>64</sup>

As opposed to design-bid-bid, a design-build model consolidates the contractor and architect services into one entity, therefore allowing the developer to manage one contract. From the beginning of the development process, contractors and architects work together in fulfilling the developer's needs to fit time and budget constraints. Architects and contractors share responsibilities and risks which encourage collaborative problem solving for any discrepancies which may arise in the development process. Collaboration between the architect and contractor help reduce changes that may occur during construction. Reducing the risk for changes in the development process help mitigate additional costs to the developer.

## Proposed Method

A proposed method of connection between the three entities is to combine the architect and developer role, as shown in Figure 8. The architect as a developer will simply manage one contract between the contractor.

<sup>64</sup> Ibid.



*Figure 8. Architect-Developer*

An architect-developer will have more leverage in the overall design and will be able to positively alter any compromises that may occur during the construction process. Also, having responsibilities of financing the project, the architect-developer will be able to impose cost driven design decisions. Combining the expertise of architect and developer would not only positively affect the design but poses other advantages that will be discussed in the next chapter.

## Chapter 6: Why Architect as a Developer?

There are several advantages for the architect to be the developer. Three will be discussed in this segment, including the following: direct savings in the development cost, increased efficiency in choosing the right drawing platform, and the execution of high-quality design.

### **Direct savings in Development Cost**

There are savings that may be consolidated within the architect fee and the developer fee for the development for affordable housing. As previously mentioned, in a design-bid-build model, developers and architects are independent entities. Therefore, the architect fee and developer fee are conventionally separated. But in the architect-developer model, the architect and developer can consolidate certain aspects of their fees. The following segment of the research will go into detail of where savings may occur in combining the two entities into one.

First, the fee for each entity must be calculated separately. The architect fee and developer fee are normally determined as a percentage of the construction cost. Based on the calculation done for each entity in Appendix D, the architect's fee is 5% for a total construction cost of \$33.9 million which amounts to \$1.70 million. The developer's fee in Appendix D is 7% of the same total construction cost which amounts to \$2.36 million. Depending on the firm and project size, the architect fee and developer fee can be calculated in different ways, but for this research the total fee will be divided into three categories of profit, hard costs, and soft costs.



*Figure 9. Architect and Developer soft cost consolidation*

As shown in Figure 9, the general allocation for the architect fee and developer fee is provided. The architect fee is divided into three parts: profit 20%, hard cost 30%, and soft costs 50% of the total fee.<sup>65</sup> First, the profit and hard costs of the total architect fee must be calculated, then the remaining amount becomes the soft cost. The developer's fee is also divided into three parts: profit 48%, hard costs 28%, and soft costs 24%. The method of determining the developer's profit is taking the amount determined in the developer's operational budget found in Appendix D, about \$1.22 million and subtracting it from the total amount of the developer fee of \$2.36 million. The budget template accounts for the hard and soft costs for the developer's fee.

In Figure 9, highlighted in red, are the soft costs that can be combined to provide some savings in the development cost. Soft costs include operational costs such as the clerical assistant, bookkeeper, office space costs, telephone, and equipment.

<sup>65</sup> LePage, Mark R., Christian Gladu, Steve L. Wintner, and Mark R. LePage. "The 6 Critical Steps to a Profitable Architecture Firm - EntreArchitect -." EntreArchitect. July 13, 2015. Accessed April 2, 2019. <https://entearchitect.com/2015/07/13/the-6-critical-steps-to-a-profitable-architecture-firm/>.

Appendix B provides a detailed calculation of soft costs between the architect and developer. The savings are made within the consolidation of line items such as office space, telephone, equipment, printing supplies, travel, travel, and training. In one scenario of calculating the architect and developer as separate entities, the sum of their total soft costs amounts to about \$1.51 million. In another scenario of calculating the combined entities of architect as developer, the soft costs amount to about \$1.17 million. The difference between the soft costs of architect and developer as separate entities and combined entities amounts to \$344,000.

## **Choosing the right drawing platform**

Within the process for developing a project, the architect and developer must agree on which drawing platform is best suited to produce drawing sets for construction. If the architect and developer are separate entities, typically, the developer delegates which platform to use. There are two major platforms that architects and developers use today, Computer Aided Design (CAD) and Building Information Modeling (BIM). There are major differences between the two platforms, and it is common for developers to stray away from using BIM for several reasons. If the architect is the developer, the architect can delegate the use of BIM, based on several advantages which developers often miss. The differences of each drawing platform will be covered, along with the details of why BIM should be used.

## **Computer Aided Design (CAD)**

Studies show that Computer Aided Design (CAD) has grown in mainstream use within the construction industry between the 1980s to the 2000s.<sup>66</sup> Not completely removed from use, CAD is still implemented in many architecture companies today. Although it has capabilities for three-dimensional application, CAD is primarily used for two-dimensional drawing. With CAD, drawings must be done separately between the architect and different engineers to make up a complete drawing set for a project. Each drawing must be checked and consolidated by the Architect, then submitted for approval by the permitting department of each state. Within the drawing set, an input of schedule, building codes, and estimated cost for project performance is entered manually.

## **Building Information Modeling (BIM)**

On the other hand, Building Information Modeling's (BIM) growth in mainstream use within architectural offices span between 2007 and 2012.<sup>67</sup> Contrary to its development within the last twenty years, the utilization of BIM is relatively new to many architecture firms. BIM provides many advantages beyond its speedy process of simultaneously allowing the user to produce drawings in two-dimensions and three-dimensions. Also, BIM allows consultants who typically operate in separate offices like architects and mechanical engineers to simultaneously work on the same computer model for a project. Real-time collaboration provides a clash detection feature within BIM, collisions between architectural elements and mechanical elements can be resolved instantaneously. What's more, systems for input such as

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<sup>66</sup> "History of AutoCAD." The Design Build Academy. February 23, 2016. Accessed April 2, 2019. <https://designbuildacademy.com/history-of-autocad/>.

<sup>67</sup> Quirk, Vanessa. "A Brief History of BIM." ArchDaily. December 07, 2012. Accessed April 02, 2019. <http://www.archdaily.com/302490/a-brief-history-of-bim>.

schedule, building codes, and estimated construction cost are automatically produced within the program.

## **Savings through BIM**

To exemplify savings made through BIM, a comparison of cost between CAD and BIM will be explained. The parameters for this calculation are based on the total architect fee of about \$1.70 million, 5% of \$39 million total construction cost, divided into five phases of design. The phases in the architect fee include schematic design, design development, construction documents, bidding and negotiation, and the construction phase. Appendix C provides an example of a calculation based on Manitoba Association of Architect's template to determine the architect fee between the five phases. The template denotes a percentage range for each phase in the design, differentiating between the use of CAD and BIM. The total cost of the CAD method amounts to about \$1.70 million, and BIM method amounts to about \$1.66 million. Between CAD and BIM, the total savings in Appendix C amounts to about \$50,937 or 3% savings from \$1.70 million, initially set as the architect fee. These savings could be applied directly to the total development cost.

## **Architect as Developer choosing BIM**

Despite the overall superiority of BIM over CAD, many developers stray away from implementing this program into the development process. One reason is that BIM provides a large amount of information, some of which developers do not necessarily have to know. Another reason is that BIM requires complete understanding of how it works in collaboration between consultants which include the architect, engineers, and contractor.



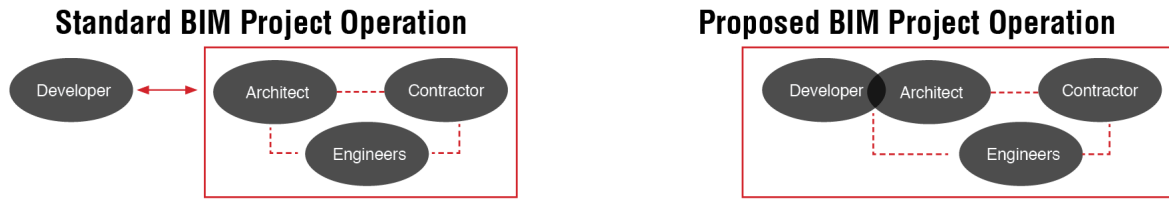


Figure 10. BIM project operation models

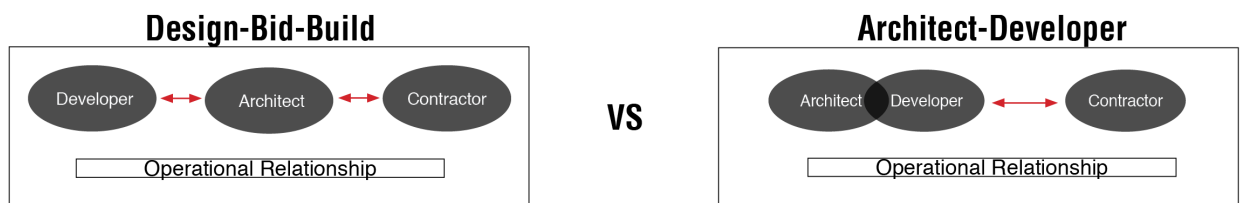
Standard BIM operation is shown in Figure 10. The developer is a constant within the process for the development of a project in BIM, but typically acts as a passive participant due to lack of knowledge for use. Also provided in Figure 10 is a proposed BIM project operations method. The suggested method suggests if the architect is the developer, an increase of involvement would be ensured between the three entities. Based on expertise and capability of using BIM to its full potential, the architect as a developer in the proposed method will not be a passive entity in the process for design.

## Execute high-quality design

Affordable housing is often built for individuals with lower income individuals to live in city centers, but in many cases the design for such developments are not attractive. Allison Arieff, an architecture critic for SPUR, and a lecturer from the UC Berkeley College of Environmental Design mentions, "most housing in the U.S. is designed and built by developers, and that's led to generic homes and neighborhoods tailored for investment rather than livability."<sup>68</sup> Livability and aesthetics should be implemented in the design for affordable housing.

<sup>68</sup> Budds, Diana. "The Rise of the Architect-developer." Curbed. December 10, 2018. Accessed April 2, 2019. <https://www.curbed.com/2018/12/10/18127314/architect-developer-urbanism>.

There are many factors that influence the development of generic homes, one being that funding from government entities for affordable housing is difficult to acquire. Details of cost as a driving factor for development will be covered in chapter 9. Another factor is that developers often value engineer components of the design that they feel are unnecessary, which affects overall design outcomes. Developers are adept in understanding the finances for affordable housing projects but are not typically trained for design.



*Figure 11: Design-Bid-Build vs. Architect-Developer Relationships*

In reference to Figure 11, the operational relationships within a design-bid-build and architect-developer are compared. Within a design-bid-build operational relationship the architect is at the mercy of the developer's needs without understanding bottom line finances. This results in the developer having to value engineer any design decisions that negatively impact total construction cost. From that, the architect is pushed to compromise their design due to cost constraints.

On the other hand, in the architect-developer model in Figure 11, design decisions are guided by bottom line finances from the very beginning of the development process. With a design background, the architect as a developer provides insight on compromises from one aspect to another.

Appendix F shows an example of a variance report made where cost estimates are made for pre-construction and actual performance (post construction). The total

variance between the two estimates is about \$1.46 million. Compromises between the design for various line items are apparent in Appendix F. Concrete has a significant variance of \$3.5 million, where actual performance cost is significantly less than the pre-construction budget cost. Also, openings were initially estimated at about \$3.9 million, but actual performance is \$2 million, resulting in a variance of about \$1.9 million. Openings are essential to provide ventilation, lighting, and climate control for buildings. They also affect essential design elements of the facade and are components which help in the transition between outdoor and indoor spaces. The compromise between concrete and openings could have been better informed from the beginning of the design phase if the architect is the developer. Compromises that occur during construction should not negatively affect the design for openings. If \$3.5 million was saved in the cost of concrete, a portion of the funds could have been applied towards increasing the design quality of the openings. An accurate estimation could have been provided to the developer and appropriate cost toward essential design elements. The example in Appendix F implies that proper collaboration between the architect and contractor for estimating construction cost was not implemented in the initial phases of development.

Schematic Design	Design Development	Construction Documents	Bidding and Negotiation	Construction Administration
Developer-supplied Data Coordination	Developer-supplied Data Coordination	Developer-supplied Data Coordination	Developer-supplied Data Coordination	Field Review
Program and Budget Evaluation	Design Coordination	Project Coordination	Project Coordination	Progress Reports/Evaluation
Architectural Schematic Design	Architectural Design Development	Architectural Construction Documents (Working Drawings, Form of Construction Contract and Specifications)	Issue Bidding Documents	Process Certificates for Payment
Schematic Design Drawings and Documents	Design Development Drawings and Documents	Document Checking and Coordination	Issue Addenda	Interpretation of Contract Documents
Statement of Probable Construction Costs	Statement of Probable Construction Costs	Statement of Probable Construction Costs	Bid Evaluation	Review of Shop Drawing Product Data/Sample
Client Consultation	Client Consultation	Client Consultation	Construction Contract	Change Orders
			Client Consultation	Substantial Performance Report and Certification
				Client Consultation

*Table 2: Standard Architect Services in Project Phases, Based on Design-bid-build Model<sup>69</sup>*

Table 2 shows typical tasks that must be completed by the architect and developer throughout each project phase in the Design-bid-build model. Highlighted in green are direct tasks that must be coordinated between the architect and developer. Constant client consultation is essential to the design process but suggests inefficiencies due to time allocated towards coordination.

Schematic Design	Design Development	Construction Documents	Bidding and Negotiation	Construction Administration
12-25%	12-25%	35-45%	2.5-6.5%	25-35%

*Table 3: Standard architect fee cost for Design-bid-build split into phases<sup>70</sup>*

Table 3 shows the percentage range for each segment of the development which sum up to become the architect fee. The bidding and negotiation included may amount up to 6.5% of the architect fee. If the architect was the developer, time and funds being set aside for bidding and negotiation could be omitted. The bidding and negotiation fee would no longer be included in the development costs; therefore, funds

<sup>69</sup> "Determining the Cost of Architectural Services." Manitoba Association of Architects. 2018. Accessed April 2, 2019. [https://www.mbarchitects.org/cost\\_of\\_architectural\\_services.php](https://www.mbarchitects.org/cost_of_architectural_services.php).

<sup>70</sup> Ibid.

may be allocated to include more man-power hours for design and efficiency for construction. Typically, in the development process, ideas for the overall design may change due to unforeseen discrepancies in costs. If the architect is the developer, negative compromises to the design would be mitigated. As a result, more time and resources could be applied towards a higher quality design. High quality design could include more amenities in an affordable housing complex like a daycare in the same development for households where both parents work full-time, increased interaction between neighbors through an easily accessible café on the ground floor, or an aesthetically pleasing building that blends well with the surrounding cityscape.

## **Chapter 7: How an Architect can become a Developer**

Architects are trained to be skillful problem solvers and provide aesthetically pleasing buildings, but they often lack the essential business skills needed to be a developer. This is due to the absence of business instruction in the educational system for architects. With strong in-depth knowledge in the process of building, architects can bring skills that would help identify potential project sites that most developers may miss.

Architects should take control of their designs and bring them into fruition with their own hands, rather than having a developer value-engineer their work. According to Archipreneur, there are four main ways that an architect can become a developer. The methods that will be discussed include building their own home, renovate an existing building, building co-housing, and crowdfund their first project.<sup>71</sup>

### **Build your own home**

Jonathan Segal, an acclaimed architect-developer recommends, the best course of action for an architect to become a developer is to build their own home. In doing so, will help architects learn important aspects such as cutting design costs, building a solid network of collaborators, and understanding facets of real estate development. Ideally, the architect should create a documentation of the process to use as a marketing tool to lead to prospective clients and other interested parties.

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<sup>71</sup> "4 Ways to Become an Architect as Developer." Archipreneur. September 17, 2018. Accessed December 03, 2018. <https://archipreneur.com/4-ways-to-become-an-architect-as-developer/>.

Also, a completed project would demonstrate their ability as an able developer and present it to potential clients.

## **Renovate an existing building**

An alternative path to becoming an architect-developer is to renovate an existing building. Once an architect has procured the right estate to renovate, he or she must arrange financing for the project. This would help them learn how to arrange large sums of money without having to use their own. An option in amassing funds is to release equity from the property that was purchased to take out a mortgage or bank loan to reinvest into the renovations of the building. Another possibility is to rent, sell, or remortgage the renovated property to draw out some funding.

Much can be learned from renovating an existing building as an architect-developer. Many architects design without the cost of the project in mind. Understanding limitations of funding will help guide the design into a direction that is realistic as an architect-developer.

## **Build Co-Housing**

Co-housing is not commonly built in the United States and is more common in Europe, especially in Denmark where it began. Co-housing is a planned community development which residents run themselves. The funds for such a development are shared by the residents and the owner or architect-developer, therefore financial risk is shared between the two entities. What's more, the control over the design is also shared between the residents and architect-developer. Mitigating risk is a big advantage, should the project fail. Being that a community of residents are also

vested, the effort for developing a co-housing project would increase because more entities are at stake.

## **Crowdfund first project**

The fourth method for an architect to become a developer is by crowdfunding their first project. Crowdfunding is a method that is specifically geared towards collecting funds through the internet. As mentioned in chapter 3, there are three major types of crowdfunding models that are applicable to the world of architecture, which include reward-based, donation-based, and equity-based crowdfunding.

Crowdfunding requires the architect-developer to generate public excitement for projects to become funded. Successfully crowdfunded projects have a wide range, from small innovative prefabricated structures, historic restoration projects, to large scale community centers. In receiving funds from many individuals, financial risk may be reduced. Risk is particularly reduced in the donation-based crowdfunding model, where the backers contribute pledges without the expectation of receiving anything back in return.

## **The Approach as an Architect-Developer**

From the previously mentioned four paths for an architect to become a developer, this thesis will focus on applying the crowdfunding method. Crowdfunding is the most progressive path because the internet is used as the medium to gather funds. This allows for many people to be involved in financing a project. In comparison to sources of funding coming from the architect-developer alone to build their own home, financial institutions who are involved with renovating an existing building, or



the limitations of number of residents in building co-housing, crowdfunding has the most potential in amassing funds.

Application for crowdfunding in an affordable housing project is a feat that is yet to be implemented in a large scale. Currently, there are many unknowns and will not be a simple effort to put together for an architect-developer. This method will require coordination and acceptance from individuals who are willing to place their support into the housing shortage crisis that exists in Hawai'i. In part 3, a business model on how crowdfunding can be used to develop affordable housing will be explained.

## ***Part 3: Business Model***

## **Chapter 8: Challenges to the Business Model**

There are many challenges that an architect must face in becoming a developer that makes use of crowdfunding. Challenges include having to compete with other seasoned developers, establishing a proper crowdfunding platform, and facing risks that conventional developers also face such as obtaining finances.

### **Architect to compete with seasoned developers**

Architects are adept at designing aesthetically pleasing structures but often lack the business training needed to put all the components of a project together. There are many factors that architects must consider, but three major ones will be covered.

The three factors that will be described include understanding market trends in developing a suitable building, knowing how to properly configure the target market units in a building, and the method for predicting future value for a planned project.

First, understanding market trends is important to determine the building typology that is in demand. Examples include building types such as mid-rise, mixed-use buildings, or townhouses. Second, seasoned developers can read market trends in setting the proper target units based on demographics. It is important in providing the proper type of housing for the correct area. An example is developing high-rise multifamily housing in a densely populated, urban area. Last, a major factor to consider is the prediction of whether the value of a development will increase or decrease as time goes on. This is where the knowledge of real estate trends play a large role in property development.

Overall, architects must familiarize themselves with finances and marketing. Ideally, the architect combines the world of creativity and aesthetics with proper skills in development. This would in turn, increase the market value of future projects. Also, rather than developing for the purpose of increasing profit margins, proper strategies for social change through development could significantly impact communities in positive ways.

A possible solution in overcoming the challenges of competing with seasoned developers is to partner up with an experienced developer on the first project. The partnership would only be set forth until the completion of the project. The experienced developer would be brought on as a consultant and provide guidance on current real estate market trends, tips on market analysis for meeting demands for the demographics of the intended site, and how to account for the project's future value. After the architect-developer should record all progress and make note of all ideas shared by the experienced developer. From there, the architect-developer can continue into the development of future projects without the consultation of the experienced developer.

## **Establishment of Crowdfunding Platform**

Establishing a suitable equity-based crowdfunding platform poses several challenges. Some existing crowdfunding companies devote entire teams to guarantee the safety of personal information and pledges. If possible, the best scenario is for the architect-developer partner up with an existing platform which have overcome some of the challenges that may arise. Three specific challenges of trust, laws, and security will be discussed.

The first challenge is related to the credibility of the platform so everyone can trust the system. Trust is especially important for equity-based crowdfunding, as people must provide pledges of money over a digital medium with an expectation of returns in their investment. As mentioned in chapter 3, protection against scams must be ensured. There must be clear indications that the creator will not disappear into another country with funds that were supposed to be allocated towards the end use of the crowdfunding goal. To prevent this from happening, a contractual agreement, such as the one discussed in Figure 3, between the creator and backers must be recognized before any funds are circulated.

To help establish trust, the platform must have a track record of successfully funded projects. Starting from scratch in establishing a platform would be especially difficult because a track record is non-existent. Fundrise is an appropriate example of a well-established equity-based crowdfunding platform. First launched in 2012, they have years of successfully funded projects. Therefore, trust is supported through proof that the system has been utilized successfully in the past.

Another challenge to consider in establishing an equity-based crowdfunding platform are the laws related to disbursing funds. Equity-based crowdfunding is a model for investing and will be treated in a similar fashion as investing in stocks. The platform must provide backers with Form 1099-B, which is an Internal Revenue Service (IRS) tax form, normally issued by investment brokers. This form is a summary of exchange transactions including gains and losses of brokers or barterers.

Transparency is important and all money exchanges that occur between projects and backers must be reported to the IRS to prevent any type of penalty that may be incurred by both parties.

Last, since crowdfunding is done through the internet, cyber security measures must be guaranteed by the platform. Crowdfunding is an industry which is monitored by the Federal Trade Commission (FTC). The FTC is devoted to the protection of consumers in financial technology, also known as, FinTech. There are two important security requirements that should be included in establishing a crowdfunding platform that include SSL connection and PCI Compliance.

A Secure Sockets Layer (SSL) connection is an encrypted link created between a browser and a web-link. This connection is important in encrypting personal information such as credit card information. An indication of an SSL connection is a little lock next to the web address and *https* in the address at the top of the web browser.<sup>72</sup>

Payment Card Industry (PCI) Compliance is a set of security standards for any company which accept credit card payments. Accepting, storing, transmitting, or processing credit card information must be maintained in a highly secure environment. There are four different PCI Compliance levels based on the number of transactions processed per year. Level 1 is the highest, requiring over six million transactions annually. PCI Level 1 compliant companies include GoFundMe and Facebook.<sup>73</sup>

The best example of a platform which has established secure transactions for equity-based crowdfunding is Fundrise, which is made up of a team including software engineers to ensure such precautions to prevent hacking of funds. As mentioned in

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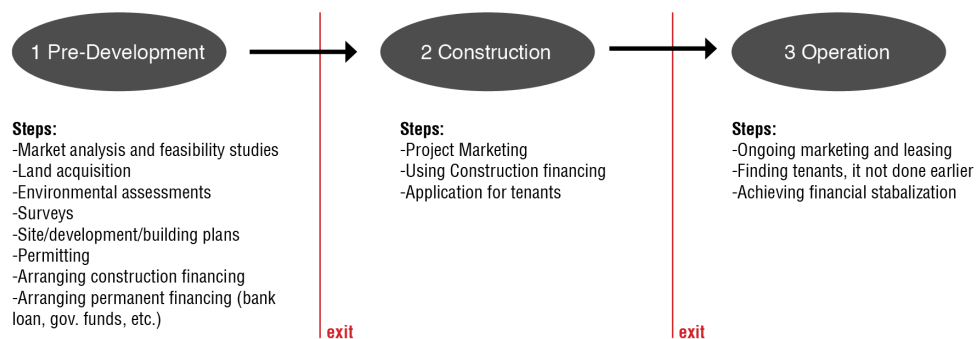
<sup>72</sup> "Is Crowdfunding Safe and Secure?" Top Crowdfunding Sites for Fundraising. November 2017. Accessed April 2, 2019. <https://www.crowdfunding.com/is-crowdfunding-safe/>.

<sup>73</sup> Ibid.

chapter 3, crowdfunding campaigns are suggested to be set at no more than 30 days to be successful. Within the duration of the transaction of funds being set in motion for a crowdfunding campaign, the pledges must be kept secure from hackers.

## Risks as a Developer

There are many risks and unforeseen hindrances that developers face when developing affordable housing. Figure 12 identifies three development phases: pre-development, construction, and operation. Below, each phase will be discussed in detail, then a possible solution in helping to mitigate the risk will be proposed.



*Figure 12. Three phases of risk for developers*

The first phase of pre-development varies most in duration, and is focused primarily on research, permitting, and due diligence. Out of the three phases, pre-development incurs the most unknowns, therefore being the riskiest. Common tasks that must be completed in this first phase include market analysis, feasibility studies, land acquisition, securing option rights to purchase land, environmental assessments, permitting, surveys, infrastructure improvements, and arranging construction financing. Obtaining construction financing from a lender or bank is an extremely rigorous process, thus clearing this step will mean the developer has cleared major hurdles to do so.

In phase two, the construction phase involves the physical construction of the project. If not established in the first phase, finalizing the arrangement for permanent financing is essential in this phase. Construction risks such as work accidents, change orders, poorly written contracts, and unexpected increases in material costs could occur. Possibilities of such events could negatively impact the feasibility of the project and the developer. Receiving a certificate of occupancy from a building department deeming the project is compliant to building codes and is suitable for occupancy serves as the milestone to the end of this phase. Also, pre-leasing and properly marketing the project will play an important role in ensuring the occupancy level in the third phase.

Although, the third phase of operation is no longer affected by pre-development and construction risk, the occupancy of the project still poses as a risk. Stabilization of the project finances can only be achieved after obtaining a 90% occupancy rate or more. Until then, within this third phase, construction financing or a short-term bridge financing must be utilized. The operation phase is the least risky out of the three, depending on the pre-leasing outcome from the second phase.

To help mitigate the risks within the three phases of development, it is important to create an agreement clause between the developer and stakeholders in whether they should proceed from one phase to another. In Figure 12, the exit clauses are highlighted in red to exemplify where such terms should be made in agreement between the stakeholders of the project. As mentioned, pre-development poses for the greatest amount of risk and longer duration to set-up, the developer should be able to exit the endeavor in the case that there are too many opposing factors to get into phase two, and on to phase three.



## **The Team**

Architects cannot become developers overnight without proper guidance.

Collaboration between existing entities would be the best way to get started on a first-time venture of creating affordable housing with crowdfunding. This is especially important because it has never been done before in Hawai'i. The team would consist of an experienced developer, a well-known crowdfunding platform, and a reputable architect. The team will be led by an architect-developer who will obtain financing for the project which will include government subsidies, bank loan, grants, trusts, and a component of crowdfunding. The architect-developer will also spearhead the design team and delegate design decisions that are guided by the bottom-line finances of the project.

### **Experienced Developer**

A seasoned developer who has the knowledge and complete understanding of LIHTC would help prepare timely schedules for what is to be expected in the process. Also, as stated in the HHFDC QAP (Appendix A) developers are more eligible for LIHTC if they have successfully developed over four LIHTC funded projects in Hawai'i.

### **Well-known Crowdfunding Platform**

A well-known crowdfunding platform is made up of an adept team of individuals who dedicate their time and expertise in helping creators spread their ideas in hopes of gaining support from backers. Collaborating with a popular platform would help point out important methods of successfully executing a crowdfunding campaign.

Fundrise is one platform that has demonstrated such expertise by successfully funding over 30 projects including multifamily apartments.<sup>74</sup>

## **Reputable Architect**

The reputable architect will act as a consultant and collaborate with the architect-developer in providing a well-designed affordable housing project. Collaborating with reputable architect such as Alejandro Aravena, Bjark Ingels Group (BIG), or Norman Foster has several advantages. Each of these entities maintain an upright international presence, having completed projects that have helped shaped the built environment on a global scale. Teaming up with one of these star architects could help boost the crowdfunding component by creating an incentive to support building affordable housing because they have track records of completing worldwide recognized projects. Also, having the reputable architect's name on the project could become a marketing tool in the crowdfunding campaign. Doing so will evoke curiosity of backers to support the talented architect's new endeavor to contribute to the housing crisis in Hawai'i.

## **Combining Forces**

An architect looking to become a developer through the means of developing affordable housing with crowdfunding will need to assemble a strong team. An experienced developer would guide the process of procuring government subsidies in Hawai'i. A well-known platform would help set the basis for allowing the local community of Hawai'i, and beyond to support the cause of providing affordable housing. Also, collaborating with a reputable and talented architect would increase support from backers in building affordable housing that is highly executed and well-

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<sup>74</sup> "Real Estate Assets." Fundrise. Accessed April 2, 2019. <https://fundrise.com/assets>.

designed. Marketing methods will especially be important in the crowdfunding segment to amplify the enthusiasm for more backers to provide needed pledges. The next chapter will go into detail in possible uses for developing an affordable housing project with implications of crowdfunding.

## Chapter 9: Crowdfunding in Hawai'i

As mentioned in chapter 3, Title III in the JOBS Act allows for interstate crowdfunding in Hawai'i and there is apparent support for crowdfunding initiatives. At an East Meets West Conference in 2016, Governor Ige stated, "I have a vision of Hawai'i becoming a hotbed of vibrant and meaningful job opportunities through the technology sector."<sup>75</sup> At the same conference, two young entrepreneurs from Hawai'i were recognized for their launch of a virtual reality company through the support from crowdfunding.<sup>76</sup> This recognition suggests that the general population in Hawai'i are aware of crowdfunding, but are currently only inclined for the purpose of supporting business startups. There are no precedents for successfully crowdfunding real estate development in Hawai'i.

### Presence in Real Estate Development

To do so would require a rigorous procedure, and a lot of time for proper coordination to initiate such an endeavor. The first major step is proving that through proper calculation, including crowdfunding into the development of affordable housing is feasible.

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<sup>75</sup> Gallagher, Kathleen. "Crowdfunding Is Key to Hawaii's Startup Future." Bizjournals.com. January 15, 2016. Accessed April 2, 2019. <https://www.bizjournals.com/pacific/news/2016/01/15/crowdfunding-is-key-to-hawaii-s-startup-future.html>.

<sup>76</sup> Gallagher, Kathleen. "Young Hawaii Entrepreneurs Start Crowdfunding after Receiving Investment at East Meets West Conference." Bizjournals.com. January 22, 2016. Accessed April 2, 2019. <https://www.bizjournals.com/pacific/news/2016/01/22/young-hawaii-entrepreneurs-start-crowdfunding.html>.

# **A Formula for Crowdfunding in Hawai'i**

The calculation for a hypothetical affordable housing project, which employs equity-based crowdfunding is included in Appendix D. The formulas in Appendix D are directly influenced by Appendix A, the Hawai'i Housing Finance Development and Corporation (HHFDC) 2018/2019 Qualified Allocation Plan (QAP). The overall method of this calculation is to prove that crowdfunding is possible in Hawai'i.

## **Hypothetical Project Parameters**

First, the basic parameters of what makes up an affordable housing project will be covered. The project in Appendix D will include 100 total residential units, all targeting households of 60% AMI or less. The location of this project is Honolulu, Hawai'i, and land acquisition costs will not be included in the calculation. At a glimpse, the total cost of the project will be about \$37.71 million, including hard costs and soft costs.

The unit configuration of the project in Appendix D is based the on HHFDC's QAP which encourages a mixture of units targeting households below 60% AMI. To maximize the project's eligibility in receiving tax credits, the configuration of the 100 units are 6 units targeting 30% AMI households, 44 units targeting 50% AMI households, 49 units targeting 60% AMI households, and 1 property management unit. The total income for each household is determined by HUD and is updated annually. Appendix D incorporates the HUD income limits in 2018 for the county of Honolulu, Hawai'i.<sup>77</sup>

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<sup>77</sup> HUD. "FY 2018 Multifamily Tax Subsidy Project Income Limits Summary." Low-Income Housing Tax Credits | HUD USER. Accessed December 11, 2018. <https://www.huduser.gov/portal/datasets/il/il2018/2018summary.odn>.

Construction cost for the project is based on an average cost of multifamily construction in Hawai'i of \$445 per square feet.<sup>78</sup> In reference to Appendix D, the total square footage of the 100 units amounts to 58,700 square feet. In addition to the unit square footage, a circulation multiplier is added, amount to 76,310 square feet. Therefore, at \$445 per square feet for 76,310 square feet, the total estimated construction cost of the project is \$33,957,950.

Several consultants including: architect, mechanical engineer, structural engineer, civil engineer, and environmental engineer must be calculated in the soft cost of the overall project. In addition to providing architectural drawings, the architect is generally in charge of coordinating all drawings and work done by the engineers. The mechanical engineer oversees the mechanical systems, electrical, and plumbing for the project. Structural engineers determine the feasibility of the chosen system for constructing the project, an example is calculating the structural integrity for a concrete building. A major duty for the civil engineer is to ensure that the designs proposed by the architect for exterior and interior components of the building are sound. Environmental engineers must ensure that the project's waste disposal, air pollution, and water is controlled and does not negatively impact the surrounding area of the project site. A percentage of the total construction cost is usually calculated for each consultants' fee for the project. Appendix D provides the calculation for the consultants, totaling \$3,395,795.

Included in the soft cost for the overall project cost is the developer's fee. The developer's fee includes the operational cost for the duration of the project. In

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<sup>78</sup> Magin, Janis L. "Building a House in Honolulu Costs Nearly Twice as Much as Chicago, Report Shows." Bizjournals.com. July 6, 2017. Accessed April 2, 2019. <https://www.bizjournals.com/pacific/news/2017/07/05/building-a-house-in-honolulu-costs-nearly-twice-as.html>.

Appendix D, the operation budget contains staff members such as executive director, project manager, controller, clerical assistant, and bookkeeper. The general overhead calculation is comprised of office space costs, telephone, equipment, and training. The template for calculating the operations budget was made in 1999, therefore a line item was included to account for inflation between 1999 to 2018 of 70%.<sup>79</sup> Project duration could vary and depend on many factors for the construction of an affordable housing project. Entitlements to land acquisition in Hawai'i could take several years to attain. Appendix D accounts for the project duration to be 4 years to set a baseline amount for the developer's operational costs.

The developer's fee is generally calculated as a percentage of the total project cost. For a proposed project to qualify for low-income housing tax credits, HHFDC limits the developer's fee percentage to less than 15%. What's more, to increase eligibility of receiving tax credits, the developer is encouraged to opt for a lower developer's fee, amounting to less than 10%. To maximize eligibility for tax credits, the developer's fee in Appendix D calculated as 7% of the total construction cost, amounting to \$2,359,000.

The rent roll is a monthly total amount of rent received from tenants of the projects. The calculation for rent roll is important in determining the income that an affordable housing project can produce. The potential rent roll amount is directly related to the previously calculated, unit configuration. To be eligible for tax credits, a limit of charging each household 30% of their total income is required by HHFDC's QAP. The annual income for 4 people per household to inhabit 1 unit was a constant to

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<sup>79</sup> "CPI Inflation Calculator." U.S. Bureau of Labor Statistics. Accessed April 2, 2019. <https://data.bls.gov/cgi-bin/cpicalc.pl>.

calculate the potential income of 99 units for the project. From the calculation done in Appendix D, the total rent roll for the project amounts to \$155,130 per month.

The rent roll is used to help determine the Net Operating Income (NOI) of the project. In the Appendix D NOI calculation, gross effective income of 5% vacancy loss is included because 100% of the 100 units will not always be occupied. From there, 40% of the total rent roll must be subtracted from the gross effective income to account for the maintenance and operating cost of the project. Included in the maintenance and operating cost are property management fees, the payment to cover 1 property management unit, and future maintenance fees of the affordable housing project such as elevator repairs. The total NOI for this project amounts to \$88,424.

### **Hypothetical Project Capital Stack**

After calculating the basic parameters which include overall construction costs, soft costs of major consultants, and project income, the developer must ensure certain measures for finances for the capital stack of the project. A capital stack for affordable housing could be put together with various components and sources of financing. Shown in Appendix D, the sources of funding are simplified into four main categories of bank loan, LIHTC, grants and trusts, and crowdfunding to supplement the necessities of a \$39.7 million project.

First, the bank loan calculation is based on the NOI available to leverage a mortgage between the project development and a bank willing to enter an agreement with the developer. In Appendix D, a Debt Coverage Ratio (DCR) is used to determine the eligibility of funds that the project can sustain to cover the loan terms of 30 years at



7% interest. With a DCR of 1.50 divided into an NOI of \$88,424 this project is eligible for a total mortgage of \$8.7 million, 22% of the capital stack.

Typically, the bank loan segment is calculated to a maximum mortgage where the DCR is set at 1.15, but for this project the DCR will be set at 1.50 to allocate a portion of the Cash After Debt Service (CADS) to be disbursed into the crowdfunding segment of the capital stack. Further details of the CADS distribution will be explained in the Crowdfunding calculation.

As mentioned in a chapter 2, attaining Low-Income Housing Tax Credits (LIHTC) involves a long and meticulous process. Appendix D exemplifies how to calculate a project's eligibility based on several criterion items included in Appendix A, within the HHFDC QAP. After calculating the total development cost, the developer must request for a percentage amount of the total development cost to be covered by LIHTC, also known as the qualified basis. To maximize eligibility of tax credits, Criterion 1B of the QAP encourages the percentage of the total development cost, to be less than a 40% ratio, amounting to about \$16.6 million as the qualified basis. From there, the qualified basis is multiplied by a "credit rate" of 8% or \$1.3 million. The credit rate for the 9% tax credits fluctuate between 8%-9% and was closer to 8% between the late 1990s to 2008.<sup>80</sup> Investors will receive the \$1.3 million for ten consecutive years, summing up to \$13.3 million. Tax credits are sold to investors, based on how much the investors are willing to pay for the credits and other transaction costs related to the sale of the credits. Between 2016 to 2018, the tax equity price per credit averaged about \$0.90 to the dollar.<sup>81</sup> Finally, multiplying the

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<sup>80</sup> Schwartz, Alex F. *Housing Policy in the United States*. New York: Routledge, 2015.

<sup>81</sup> Novogradac & Company LLP, [www.novoco.com/atom/175071](http://www.novoco.com/atom/175071).

total tax credits for ten years with the price per credit would amount to about \$11.98 million in equity generated from LIHTC, 33% of the capital stack.

There are many various grants and trust funds available in the State of Hawai'i. Each program varies on flexibility of uses and eligibility for projects. Therefore, the calculation for grants and trusts were based on a comparison between eight similar affordable housing projects, which incorporated a combination of government subsidies including grants and trusts. A percentage of grants and trusts in the capital stack was derived from eight case studies included in Appendix D, ranging from 24% to 58%. After benchmarking the amount and identifying sources of funding used in the Ola Ka 'Ilima Artspace Lofts project, the result of grants and trusts applied to the hypothetical affordable housing calculation in Appendix D amounted to \$16.2 million or 41% of the capital stack. The result falls within the percentage range set forth by comparing the eight similar case studies.

After the successful assembly of LIHTC, bank loan, grants, and trusts, the remaining gap finance becomes the premise for the equity-based crowdfunding segment of the capital stack. The gap financing will vary depending on the developer's ability to amass funds for the project. Based on the calculation in Appendix D, and a total project cost of \$39.7 million, the remaining funds needed amounts to \$1.4 million, 4% of the capital stack. From a study done by Crowdsociety of 100 crowdfunding architecture projects, the range for number of backers per project was between 72 to 1,200 people.<sup>82</sup> From benchmarking 80% of Crowdsociety's findings, the number of backers calculated in the crowdfunding campaign for Appendix D was 1,000 backers. Although, creators do not typically set a required amount for pledges per

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<sup>82</sup> "100 Projects of Crowdfunding in Architecture." CrowdSociety. May 21, 2015. Accessed April 2, 2019. [http://crowdsociety.org/index.php/100\\_projects\\_of\\_crowdfunding\\_in\\_architecture](http://crowdsociety.org/index.php/100_projects_of_crowdfunding_in_architecture).

person, in Appendix D, the crowdfunding goal for \$1.4 million will be evenly divided by 1,000 backers. As a result, in order to reach the crowdfunding goal, a minimum of \$1,400 is needed from each backer.

The equity-based crowdfunding model calculation in Appendix D must start with the Cash After Debt Service (CADS) amount. CADS is directly related to the Debt Coverage Ratio (DCR) established between the bank loan agreement within the capital stack. As previously mentioned, the maximum mortgage that this project is eligible for is not requested. The reason is to opt for more CADS to be disbursed to backers in the equity-based crowdfunding segment of the capital stack. Therefore, the developer must request to defer the maximum mortgage that the project is eligible for. A deferred mortgage combined with crowdfunding costs more to borrow than opting for a maximum mortgage. But in doing so, provides an opportunity for the funds produced from an affordable housing project to be distributed towards non-accredited investors. A calculation of the difference is shown in Appendix D, Max Mortgage VS Deferred Mortgage.

The CADS per year will set the limitations of funds that may be disbursed as returns to the backers. For the calculation in Appendix D, the returns will not include interest, dividing the yearly CADS of \$353,696 to 1,000 backers. An agreement between the developer and backers must be established in the platform to determine the duration of the disbursement of returns. In Appendix D, the backers are expected to receive returns over the course of ten years, therefore they will be paid back for their initial contribution to the crowdfunding campaign within the first years of returns. After subtracting their initial contribution of \$1,400 a backer could potentially receive about \$2,100 in return after ten years.

There are other available methods of investing small sums of money for middle class citizens. These methods include conventional bank savings which produce annual percentage yield of 0.04% to 0.4%, or 30-year treasury bonds of 3%. Also, Fundrise promises 8.7% to 12.4% returns on their crowdfunding platform.<sup>83</sup> A commitment to a ten-year agreement of equity-based crowdfunding, as exemplified in Appendix D, allows for an annual percentage yield of 17%.

## **Summary**

The method of amassing funds for an affordable housing project depend on many factors, there is no single method of doing so. One factor includes the ability to include bank loans into the capital stack and will be influenced by the willingness for banks to lend funds to developers. Another factor includes the calculation of government subsidies, which vary depending on the scale of the project and the availability of funds. Crowdfunding is meant to become an alternative source of funds that could be included into the capital stack.

In Hawai'i, there are currently no affordable housing projects which include crowdfunding. Developers and financial institutions have yet to attempt such a feat, but it is not impossible. In the next chapter, the advantage of an architect who becomes the developer, paired with equity-based crowdfunding will be applied to existing case studies located in Hawai'i, therefore prove that such a method is possible.

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<sup>83</sup> "Fundrise." Resources | Fundrise. Accessed December 03, 2018. <https://fundrise.com/>.

## **Chapter 10: Application to Case Study**

Two case studies will be used to apply advantages of the architect as a developer and include crowdfunding into the capital stack.

### **Case Study 1: Kakaako Project A**

#### **Project Info**

The focus of this segment is to exemplify the usage of crowdfunding onto an actual project's capital stack. In reference to Appendix E, an affordable housing project currently under construction in Kakaako, Honolulu, includes 80 total units, all targeting households at 60% AMI or less. The total development cost is about \$56.1 million.

#### **Capital Stack**

The capital stack of Kakaako Project A is made up of five main components, including: bank loans, LIHTC, grants and trusts, deferred developer fee, and capital campaign. Appendix E includes the exact dollar amounts for each component with LIHTC covering the highest amount of about \$21 million, 39% of the capital stack. The LIHTC portion was awarded by the Hawai'i Housing Finance and Development Corporation (HHFDC), made up of 9% credits and 4% credits. These tax credits were sold to Raymond James, an American multinational financial services firm. HHFDC also awarded Kakaako Project A with Hula Mae Bonds and Rental Housing Revolving funds. The State of Hawai'i provided a portion of \$3.3 million in the form of Grant in Aid (GIA), while the City and County of Honolulu provided \$1.2 in HOME loan. Hawai'i Community Development Authority (HCDA) helped by providing a land lease, for the project, of \$1 per year for the life of the project. Lastly, the capital

campaign in the form of philanthropy, or donation funds gathered from affluent individuals over the course of several years covered \$3.1 million, 6% of the capital stack. The business model of combining the role of architect as a developer with crowdfunding will replace the capital campaign segment of Kakaako Project A.

## **Proposed Capital Stack**

First, in Appendix E, there are two types of savings that can be subtracted from the target gap finance, \$3.1 million, if the architect is the developer. If the architect were the developer, consolidating soft costs between the two entities would amount to \$344,300. Also, the architect as a developer will delegate Building Information Modeling (BIM) as the proper architecture platform to arrange the needed drawings for the project in all phases of the design, amounting to a total savings of \$50,937. Combining the consolidation of soft costs with the chosen BIM platform, a total of \$395,237 will be subtracted from the capital campaign amount, leaving \$2.7 million as the gap financing that equity-based crowdfunding will replace.

The crowdfunding goal in Kakaako Project A, \$2.7 million will be covered by 1,000 backers, each backer will provide a pledge of about \$2,700. To determine the return for each backer, the NOI and CADS must be calculated. Based on the bank loan of the capital stack amounting to \$10.9 million, with loan terms of 30 years and 7% interest, and electing to defer the mortgage at a DCR of 1.4, the NOI totals \$101,524. From there, provided in Appendix E, the CADS is calculated by subtracting the Debt Service from the NOI, amounting to an annual balance of \$348,081, which will be disbursed to 1,000 backers. Based on a ten-year agreement plan established by the architect as a developer and the backers, the initial pledge of about \$2,700 for the project will be returned to the backer within the first eight

years. Backers will be provided with a potential return of \$889 in the remaining two years of the agreement, a 13% annual percentage yield.

## **Summary**

After applying the equity-based crowdfunding method onto Kakaako Project A, the annual percentage yield (APY) for a non-affluent investor amounts to 13%. The resulting APY outperforms other types of investing such as conventional bank savings account of less than 0.40%, treasury bonds of 3%, or Fundrise at less than 12.4%. This is important information for an individual to understand because an equity-based crowdfunding investment in an affordable housing project could far outweigh an investment with other conventional methods.

## **Case Study 2: Kakaako Project B**

### **Project Info**

Case Study 2 will be the basis of providing possibilities for improving the design quality through the consolidation of architect as a developer. Similar in scale to Kakaako Project A, Kakaako project B is also currently under construction, providing 111 units and target households at 60% AMI or less. The total cost of development for Kakaako Project B is \$27 million.

### **Construction Pro Forma: Variance Report**

In reference to Appendix F Construction Pro Forma: Variance Report, comparison data between the budget of initial construction cost, pre-construction (estimate A) and actual performance (estimate B) is provided. There are several line items where the variance is as high as \$6 million, such as line item 13 Special Construction. The total variance between estimate A and estimate B is about \$1.5, a 5% difference from the initial construction cost. Variances in construction cost is inevitable between pre-construction and post construction but the allocation for funds between construction components should be directed in the early design phases of design.

### **Architect as Developer Advantage**

Within Appendix F, Variance Report line 3 for concrete, the pre-construction estimate was about \$4.8 million and actual performance was about \$1.3 million, with a resulting variance of \$3.4 million. Whereas, for furnishings, the pre-construction estimate was about \$654,000, while the actual performance was about \$315,000. Based on this data, a compromise in furnishings for the project occurred between the design of pre-construction and actual performance. If the architect was the



developer in Case Study B, cost savings that were apparent in the concrete design could have been allocated towards improving the furnishings. As a result, the quality of spaces for residents would be improved.

Another example of cost driven design decision-making are the lanais in Case Study B. The Basis of Proposals of Lanais, included in Appendix F, shows a conventional design for lanais. However, lanais for a multistory building make up a major part of the aesthetics. In the early phase of designing an affordable housing project, the basis of proposal of the overall facade should be considered. This would help mitigate the stigma of affordable housing not being attractive places to live. Among other factors beyond the design of the facade, the overall living quality could be increased through better designed spaces.

## Chapter 11: Discussion

This dissertation has covered three important aspects of affordable housing, architect-developer, and advantages to crowdfunding. These aspects will be reviewed in the next segment, followed by a summary of how they all fit together.

### **Affordable Housing**

Affordable housing is important because critical workers who are essential to the economy must be able to afford to live in Hawai'i. The need for affordable housing has been a concern in Hawai'i for years. As mentioned throughout this thesis, one hurdle in developing affordable housing is the high cost of construction. Therefore, there is a definite need for financial support from entities like government subsidies and financial institutions to produce more housing units geared towards low-income individuals. Government subsidies are not always readily available and the need for alternative methods for financing a project is apparent.

Also, design is an important issue which is related to the finances for developing affordable housing projects. They affect the livelihood of residents and make up for the appeal to wanting to inhabit them.

Case Study A was successfully financed through a combination of government subsidies, bank loan, and philanthropy efforts while keeping the quality of design to a marginal level. An example includes double height ceilings for all 80 units of the project. This will give residents a larger value for the space and encourage a sense of value for their homes, they are provided with high ceilings allowing for natural ventilation and fresh air.

The architect designed the project in a way that allows a resident to feel like they are privileged with a feature in the design that is typically found in luxury developments. Dignity is a big part of success, and well-designed housing can give residents a sense of pride or dignity which in turn could motivate them to strive for more.

Unfortunately, the project took over ten years to initiate from land acquisition to design, all the way up until the start of construction. The demand for affordable housing exceeds the current supply, and due to inevitable increase of population, time constraints is an important issue in development.

## **Architect-Developer**

There is a need for more architects to be trained as developers in order to implement better designs at their own power. As previously discussed, architects' designs are typically at the mercy of the developer and financial factors. If the architect is the developer, full control over the design can be attained through the transparency of understanding the bottom-line finances. An architect-developer who has extensive training in design and has full understanding of how to finance a project is not only creative but also numerate. He or she has advantages over the competition of other developers who are only driven by cost to complete projects, and delegate changes to designs done by an architect. What's more, many developer led projects result in generic boxes for people to live in because they are tailored for investment over livability.<sup>84</sup> The architect-developer's role is to mitigate this pattern of creating mediocre dwellings low-income individuals.

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<sup>84</sup> Budds, Diana. "The Rise of the Architect-developer." Curbed. December 10, 2018. Accessed April 2, 2019. <https://www.curbed.com/2018/12/10/18127314/architect-developer-urbanism>.

Real-time design decisions made by the architect-developer can decrease overall project cost. These savings allow for flexibility in the design altogether. With the execution of a better designed building, marketing becomes easier and more people will be willing to inhabit the project. Providing more highly desirable affordable housing in Hawai'i would help more locals feel at home, rather than driving them out with outrageously priced, small boxes.

## **Advantages to Crowdfunding in Hawai'i**

Crowdfunding provides three major advantages, if implemented in the development of affordable housing in Hawai'i. The advantages include investment opportunities for providing an alternative source of funding for development, middle class citizens, and a positive impact in the social implications that will be raised.

First, methods for financing development is available in Hawai'i, but is not an easy feat to overcome. Due to the high cost of affordable housing, government programs to aid are often used to finance the project. Unfortunately, these funds are not always guaranteed, and developers are often required to get creative in amassing funds. Also, obtaining enough funds could take years but crowdfunding could provide finances within the span of 30 days. This is where crowdfunding could fit into the mix for plugging into a capital stack to fill gap financing.

Second, Backers in a crowdfunding project can potentially lead to teaching a person, who is not accustomed to investing in real estate to become a future investor. This, in turn, pushes the economy to be driven forward as the money gained does not stop at being put into a person's pocket or a savings account, which does not benefit society.

Finally, the use of crowdfunding in developing an affordable housing project in Hawai'i could provide a social and cultural benefit that is specific to the locals. Benefits include public awareness, engagement in helping a positive effort, and fosters a sense of ownership over future developments. With a strong sense of ownership, comes an incentive for more stewardship. There is a disconnect between locals and new development in Hawai'i. Most of this disconnect is based on the unawareness of projects being built up before it's too late.

## **Summary**

This dissertation provides a guideline in obtaining an alternative source of funding to develop affordable housing in Hawai'i, by imploring crowdfunding efforts led by an architect-developer. The process of affordable housing development has many facets to overcome, and methods for amassing funds is a major aspect to consider before starting any project. What's more, succession in these developments should not stop at the completion of the physical structure. Design covers aspects that go beyond the numbers and physical appearance, therefore, must be implemented to increase the quality of life for low-income inhabitants. For such efforts to be guaranteed, the team must be led by an individual who prioritizes the benefit of the end users. A leader who would best fit this description is an architect-developer.

## **Chapter 12: Future Study**

The results of this research could lead to future ventures related to affordable housing, architects, and crowdfunding implications.

### **Affordable housing**

The application of the business model was only fitted towards a mid-rise affordable housing development model. This leaves room for expanding the business model to be scaled upwards into projects such as high-rise buildings, mixed-used buildings, or even large-scale application for development of large communities in third world countries.

### **Architect and Developer**

The architect-developer model paves the way for future architects who wish to pursue development. Exemplified in this research is the implication of crowdfunding the first project. There are ways that an architect can become a developer, not included in this research, but the main idea is that there are different career paths for every architect and following conventional methods of entering large architecture corporations does not always have to be the first choice. What's more, architects typically lack training in understanding real estate development. This research looks to spark an incentive to incorporate practices of development in more architectural education programs.

## **Crowdfunding Implication**

There was only one crowdfunding method exemplified in this research. A possible business model that involves equity-crowdfunding could be initiated where returns are applied towards lowering the cost of rent. Also, rather than just for a rental housing development, equity-based crowdfunding could be applied to projects with potential for homeownership. Complications such as contractual agreements and changes of housing policy may arise, but if an alternative business method is explored, this could provide further support in producing more affordable housing in Hawai'i.

## **Appendix A: HHFDC QAP**

### **Overview**

An adapted collective of the Hawai'i Housing Finance and Development Corporation (HHFDC), 2018/2019 Qualified Allocation Plan (QAP) for Low-income Tax Credits (LIHTC)

#### **Application and Award Process:**

The Executive Director of HHFDC has sole discretion to defer the consideration of the application in the best interest of meeting housing needs. If fully completed and accepted based on the requirements on the QAP, projects will be ranked in comparison to other completed applications. The highest ranked projects are then further evaluated in determining the minimum amount of LIHTC to allow feasibility. Included in the QAP is information for requirements in applying for Rental Housing Revolving Funds (RHRF) Award Loan.

The award of LIHTC is based on a point system formulated by the QAP. This point system is not the sole determining factor for awarding LIHTC but is an important element in determining how each project ranks amongst other applicants. In the best interest of affordable housing in the State of Hawai'i, HHFDC will consider other relevant factors amongst the following criterion:

1. Development team experience and performance;
2. Financial condition and performance;
3. Related developments;
4. Development timing;
5. Tenant health and safety;
6. "At-Risk" conversations;
7. Housing Inventory;
8. Affordable housing policies at the State and County levels;
9. Development and operating budgets; and
10. Market Conditions.



## **Selection Criteria – Minimum Thresholds**

Applicants are required to meet the following Minimum Threshold requirements to be considered for LIHTC awards. Failure to do so will result in an immediate rejection of the application. There is a total of twelve (12) items in the Minimum Threshold requirements and will be referenced accordingly to HHFDC's 2018/2019 Qualified Allocation Plan which include:

1. Market Study
2. Site Control
3. Capital Needs Assessment (Projects acquiring an existing property)
4. Public Housing Waitlist/Homeless Services Programs
5. Smoke Free
6. Contractor Profit Limitation
7. Debt Service Ratio
8. Phase I Environmental Assessment
9. Proof of Non-Profit Status
10. Developer Fee
11. Minimum Affordability Period
12. 4% LIHTC Developer Experience

1. Market Study

At the Owner's expense, a comprehensive Market Study of housing needs for low-income individuals within the area to be served must be executed and submitted by a disinterested party. The Market Study must be submitted within 6 months from the submittal of the application; failure to do so will result in a rejection of the application. This Market Study is in accordance to Section 42 (m)(ii) of the Internal Revenue Code.

Based on the QAP, The Market Study must address the following:

- Statement of the competence of the market analyst
- A description of the proposed site

- Demographic analysis of the number of households in the market area which are income eligible and can afford to pay the rent. Estimate of capture rates for the market areas.
- Geographic definition and analysis of the market area
- Analysis of household sizes and types in the market
- A description of comparable developments in the market area
- Analysis of practically available rents, vacancy rates, operating expenses and turnover rates of *comparable properties* in the market area
- Analysis of practically available rents, vacancy rates, operating expenses and turnover rates of *market rate properties* in the market area
- Expected market absorption of the proposed rental housing, including a description of the effect of the market area
- Identification and commentary of proposed projects in the market areas
- Analysis of market demand for tenants with special housing needs when applicable

Also included in the QAP: projects requesting eligible basis from a Community Service Facility, defined in Section 42 (d) (4) (C) (iii) are required to provide a market study in order to address the following:

- A description of Services provided that improve the quality of life for community residents
- The market area and demand for services provided
- The applicability of service provided to the community
- The affordability of the services provided persons of 60% AMGI or less

## 2. Site Control

In a form that is acceptable to the HHFDC, the applicant must have control of the site. Therefore, evidence of site control must be provided with the application.

3. Capital Needs Assessments (Projects acquiring existing property; all units need to be reviewed)

A Capital Needs Assessment is meant to ensure the adequate performance of the useful life which exceeds the Extended Use Period. Such an assessment must be done by a competent third party and submitted with the application.

4. Public Housing Waitlist/Homeless Services Programs

The applicant must certify that all low-income units be made available to individuals who are on the waiting list for low-income public housing and/or any acceptable shelter program. Based on the QAP the following must be submitted in the application:

- a) Public Housing Waitlist/Homeless Services Certification
- b) Copy of the letter submitted to the local public housing authority which administers the public housing waiting list
- c) Copy of the letter submitted to the Department of Human Services, Homeless Programs Office

5. Smoke Free

Based on the QAP, smoking must be prohibited by the Owner in all projects.

6. Contract Profit Limitation

According to the QAP, Contractors are limited to their profit in each project and the following requirements must be fulfilled:

- a) Contractor's profit, including general requirements and overhead, shall not exceed 14.0% of hard construction costs.
  - i. Contractor General Requirements include insurance, security, fencing, etc.
- b) The Project shall evidence compliance with this section at application through Exhibit Bravo – Project Budget/Uses Worksheet of the Consolidated Application

- c) The project shall evidence compliance with this section at project completion via audited final cost certification
- d) The contractor profit limitation is a requirement of the developer and the contractor.
- e) Contractor Profit Percentage is calculated as follows:

						Exhibit Bravo		
						0		
						Project Budget/Uses		
						Total Units	Total Sq. Ft.	
						-	-	
						Cost Per Unit	Cost Per Square Foot	% of Total
								Cost
								Cost
								Eligible Basis
Construction/Rehabilitation Work:								
3 Site Work - Off Site						#DIV/0!	#DIV/0!	#DIV/0!
4 Site Work - On Site						#DIV/0!	#DIV/0!	#DIV/0!
5 Rehabilitation (Exhibit Bravo-1)						#DIV/0!	#DIV/0!	-
6 New Construction - Residential						#DIV/0!	#DIV/0!	#DIV/0!
7 New Construction - Commercial						#DIV/0!	#DIV/0!	#DIV/0!
8 New Construction - Community Svc Facility						#DIV/0!	#DIV/0!	#DIV/0!
9 Parking						#DIV/0!	#DIV/0!	#DIV/0!
10 Contractor Profit						#DIV/0!	#DIV/0!	#DIV/0!
11 Contractor Overhead						#DIV/0!	#DIV/0!	#DIV/0!
12 Contractor General Requirements						#DIV/0!	#DIV/0!	#DIV/0!
Subtotal: Construction/Rehabilitation						#DIV/0!	#DIV/0!	-

*Table 4 HHFDC QAP: Exhibit Bravo - Contractor Profit Calculation*

- i. Contractor Profit (numerator) is the sum of the following items on Exhibit Bravo:
- Site Work: Contractor Profit
  - Site Work: Contractor Overhead
  - Site Work: Contractor General Requirements
  - New Building/Rehabilitation: Contractor Profit
  - New Building/Rehabilitation: Contractor Overhead
  - New Building/Rehabilitation: Contractor General Requirements
- ii. Construction Costs (denominator) is the sum of the following items in Exhibit Bravo:
- Site Work: Cost
  - New Building/Rehabilitation: Cost
  - Excluding Contractor Profit for Sitework and New Building/Rehabilitation

- iii. Contractor Profit Percentage is Contractor Profit divided by hard Construction Costs and shall not exceed 14.0%
- iv. If there are multiple prime contractors, each contractor's profit, including general requirements and overhead, shall not exceed 14.0% of the hard construction cost for that contract.

## 7. Debt Service Ratio

This segment is regarding the loan of which will be calculated in the capital stack of the project. The Debt Service Ratio (DSR) is a measure that financial institutes use in determining the maximum mortgage a project is eligible. This is based on the Net Operating Income (NOI) for the project.

In reference to the QAP:

- a) Project with hard debt service requirements with or without an application for a Rental House Revolving Fund (RHRF) Project Award Loan:
  - i. The Project is required to evidence a DSR of no less than 1.15x on all hard debt service requirements for the duration of the initial 15-year LIHTC compliance period. Applicants may underwrite an RHRF Project Award based on required terms, including cash flow contingent payments.
- b) Projects with no hard debt service requirements and applying for an RHRF Project Award Loan:
  - i. The Project is required to evidence a DSR of no less than 1.15x on the requested RHRF loan for the duration of the amortization period. The applicant is required to use the following assumptions in underwriting the RHRF loan:
    - 1. Interest Rate: Long-Term Applicable Federal Rate in effect for the month the Consolidated Application is released
    - 2. Amortization: Full Amortization over 35 years.
- c) Projects with no hard debt service requirements and not applying for an RHRF Project Award Loan:



- 1) Annual Income Inflation Rate of 2.0% and Annual Expense Inflation Rate of 3.0% for the first 15 years or term of the first mortgage, whichever is greater.
- 2) Annual Income Inflation of 2.0% and Annual Expenses Inflation Rate of 2.0% for the remaining term of affordability.
- 3) Vacancy Rate of no less than 5.0%
- 4) Annual Replacement Reserve Allocation of no less than \$300 per unit per year.

#### 8. Phase I Environmental Assessment

An assessment that is required by all applications. For all acquisition/rehabilitation projects, the assessment must address lead-based paint and asbestos.

#### 9. Proof of Non-Profit Status

For those applying under the Federal non-profit set aside, the following must be submitted:

- a) Articles of Incorporation
- b) Copy of a current 501 (c)(3) IRS Tax Exemption Letter

#### 10. Developer Fee

Based on the QAP, the Developer Fee includes developer fee, developer overhead, management fee, consultant fee, etc. (Indicated in the Consolidated Application).

					Exhibit Bravo				
					0				
					Project Budget/Uses				
					Total Units	Total Sq. Ft.			
					-	-			
						Cost Per		% of Total	
					Cost Per Unit	Square Foot	Cost	Cost	Eligible Basis
<b>Developer Fee: (Exhibit Bravo-3)</b>									
44 Developer - Fee					#DIV/0!	#DIV/0!	-	#DIV/0!	-
45 Developer - Overhead					#DIV/0!	#DIV/0!	-	#DIV/0!	-
46 Developer - Consulting Fee					#DIV/0!	#DIV/0!	-	#DIV/0!	-
47 Developer - Management Fee					#DIV/0!	#DIV/0!	-	#DIV/0!	-
Subtotal: Developer Fee					#DIV/0!	#DIV/0!	-	#DIV/0!	-

*Table 6 HHFDC QAP: Exhibit Bravo – Project Budget/Uses*

The Developer's fee is based on the two (2) available LIHTC: 9% (volume cap) LIHTC and 4% (non-volume cap) LIHTC. In reference to the QAP, the maximum amount limits are described below:

- a) 9% (volume cap) LIHTC:
  - i. New Construction – maximum developer fee of 15% of the total development costs (excluding developer fee) or \$3,750,000 (whichever is less)
  - ii. Acquisition/Rehabilitation – maximum developer fee of 10% of the acquisition costs and 15% of the rehabilitation costs (excluding developer fee) or \$3,750,000 (whichever is less)
- b) 4% (non-volume cap) LIHTC:
  - i. Maximum developer fee of 15% of the total development costs (excluding developer fee) if the applicant waives their right to a qualified contract.
  - ii. Maximum developer fee of 5% of the total development costs (excluding developer fee)

#### 11. Minimum Affordability Period

Based on Section 42 in the Internal Revenue Code the minimum period to keep the prices for rent in an affordable housing project is 15 years. HHFDC's QAP extends that period to the following:



- a. Applicants requesting an award of 4% LIHTC must commit to a minimum affordability period of 45 years

#### 12. 4% LIHTC Developer Experience

Developers looking to apply for 4% LIHTC are required to have a certain amount of experience based on the QAP:

- a. Minimum of one (1) LIHTC project Placed in Service by the Project Owner (General or Co-General Partner/Managing or Co-Managing Member).
- b. Minimum of one (1) LIHTC Project currently managed by the Management Agent.

#### **Low Income Housing Tax Credit project financed with Tax-exempt Bonds:**

According to the QAP, projects financed with tax-exempt private activity bonds may qualify for LIHTC in excess of the State's volume cap. A commitment to issue private activity bonds from the state or local government is required to apply for an allocation of LIHTC. The application must be submitted concurrently with an application for Private Activity Tax-exempt bonds from the HHFDC.

## Criteria Point System

Table 7 is included in the HHFDC Qualified Allocation Plan. HHFDC uses this point system to help guide their decision on which projects to award LIHTC in relation to other applicants and the rankings between the results.

	CRITERIA	POINTS
1.	LIHTC Resource Efficiency – Use and Leverage.	0-9*
2.	County Income Adjuster	0-4*
3.	Overall project feasibility.	0-22*
4.	The ratio of developer fee as a percentage of total project cost.	0-7*
5.	Project will be receiving project-based rental assistance subsidies for the first time.	0-7*
6.	State/Local Government Support.	0-6*
7.	Energy Efficient and Green Building.	0-4*
8.	Project location and market demand.	0-6*
9.	Developer experience.	0-7*
10.	Project will provide low-income units for a longer period than is required under Section 42 IRC.	0-7*
11.	Project will give preference to tenant populations.	0-2*
12.	Project serving tenants with special housing needs.	0-2*
13.	Project will provide a greater percentage of low-income units than required under Section 42 IRC.	0-10*
14.	Project is participating with a local tax-exempt organization and is sponsored by a qualified non-profit, as defined in Section 42 IRC.	0-3*
15.	Projects offering tenants an opportunity for home ownership.	0 or 1*
16.	Project is located in qualified census tract, the development of which contributes to a concerted community revitalization plan as determined by HHFDC.	0 or 2*
17.	Historic Nature.	0 or 1*
18.	Waiver of Qualified Contract	20*

*Table 7 HHFDC QAP: 2018/2019 Criteria Point System.*

Projects will be ranked accordingly to the total amount of points scored in each of the eighteen (18) criterion. Each category in the Criteria Point System will be explained in detail to determine the scoring system:

**Criterion 1: LIHTC Resource Efficiency Use and Leverage****Total Points: 9 points****1A – LIHTC Use**

The following ratio is derived from the following formula:

$$\text{Total Federal Tax LIHTC Requested (Annual)} / \text{Total Number of Proposed LIHTC Units}$$

Annual LIHTC / LIHTC Unit	Points
	Multiplier x Max Pts = Pts. Awarded
Ratio $\geq$ \$24,000	(0/9) x 5 = 0.00
\$24,000 > Ratio $\geq$ \$22,000	(1/9) x 5 = 0.56
\$22,000 > Ratio $\geq$ \$20,000	(2/9) x 5 = 1.11
\$20,000 > Ratio $\geq$ \$18,000	(3/9) x 5 = 1.67
\$18,000 > Ratio $\geq$ \$16,000	(4/9) x 5 = 2.22
\$16,000 > Ratio $\geq$ \$14,000	(5/9) x 5 = 2.78
\$14,000 > Ratio $\geq$ \$12,000	(6/9) x 5 = 3.33
\$12,000 > Ratio $\geq$ \$10,000	(7/9) x 5 = 3.89
Ratio < \$10,000	(9/9) x 5 = 5.00

*Table 8 HHFDC QAP: LIHTC Use*

**1B – LIHTC Leveraging**

The following ratio is derived from the following formula:

$$\text{Total Federal Tax LIHTC requested (annual X ten years)} / \text{Total Project Cost}$$

Total LIHTC / Total Project Cost	Points
	Multiplier x Max Pts = Pts. Awarded
Ratio $\geq$ 80.00%	(0/6) x 4 = 0.00
80.00% > Ratio $\geq$ 70.00%	(1/6) x 4 = 0.67
70.00% > Ratio $\geq$ 60.00%	(2/6) x 4 = 1.33
60.00% > Ratio $\geq$ 50.00%	(3/6) x 4 = 2.00
50.00% > Ratio $\geq$ 40.00%	(4/6) x 4 = 2.67
Ratio < 40.00%	(6/6) x 4 = 4.00

*Table 9 HHFDC QAP: LIHTC Leveraging*

**Criterion 2: County Income Adjuster****Total Points: 4 points**

In this criterion, points received is based on the Multifamily Tax Subsidy Project (MTSP) income limits determined by HUD for the county in which the project is located.

Urban Honolulu, HI MSA										
FY 2018 MTSP Income Limit Area	Median Family Income	Income Limit Category	1 Person	2 Person	3 Person	4 Person	5 Person	6 Person	7 Person	8 Person
Urban Honolulu, HI MSA	\$96,000	<a href="#">50 Percent Income Limits</a>	\$40,850	\$46,650	\$52,500	<b>\$58,300</b>	\$63,000	\$67,650	\$72,300	\$77,000
		<a href="#">60 Percent Income Limits</a>	\$49,020	\$55,980	\$63,000	<b>\$69,960</b>	\$75,600	\$81,180	\$86,760	\$92,400

*Table 10 FY 2018 Multifamily tax subsidy project income limits summary for Honolulu, HI*

Table 10 represents the MTSP income limits for the county of Honolulu, depicting 50 percent and 60 percent income limits for family sizes 1 person through 8 persons. Based on HHFDC's QAP, 60 percent for four (4) person income limits in determining point allocations are as follows:

County based points are 0 to 4 points while the county with the highest income limit receives 0 points. Points for the remaining counties are based on their proximity between the highest and the lowest income limits. Honolulu County (O'ahu) scores zero (0) points.

### **Criterion 3: Overall Project Feasibility** **Total Points: 22 points**

Based on the QAP, the following criterion is based on HHFDC's evaluation including, but not limited to the following three (3) items (each have sub point allocation):

#### **1. Reasonableness of Development Costs ("RDC")** **0 to 9 points**

New Construction projects (9% LITHC and 4% LIHTC reviewed separately) will be ranked and scored in comparison to other applicants.:

#### **2. Applicant's readiness to proceed with development of project**

**0 to 10 points**

Identification of serious issues in need of resolution of the project to proceed in a timely manner and the ability of the Development Team to resolve these issues such that the development will commence in a timely manner.

**3. Tenant Services and Amenities**

**0 to 3 points**

The points of this section will allow developers to score points for providing tenant services and amenities that will enhance the livability of the project.

**Criterion 4: The ratio of developer fee as a percentage of total project cost**

**Total Points: 7 points**

Based on the following criterion from the QAP, the applicant chooses to limit the total Developer fee as a percentage of the total development cost (excluding developer fee) as presented in the application. The Developer Fee consists of total fees paid to the Developer, including, but not limited to, project management fees, consulting fees, developer fees, and developer overhead. Components in the Developer's Fee which are not included are: Architectural, Engineering, Accounting, and Legal fees.

As mentioned previously in this document, the Developer Fee is subject to a maximum threshold cap. Exceeding of this threshold cap results in an immediate rejection of the application.

In reference to the QAP for this criterion, applicants receive scores based on the following table below.

9% LIHTC Applicants:

New Construction		Acquisition / Rehabilitation			
		Fee on Acquisition		Fee on Rehabilitation	
Fee	Points	Fee	Points	Fee	Points
15% > Fee ≥ 13%	0	10% > Fee ≥ 8%	0	15% > Fee ≥ 13%	0
13% > Fee ≥ 11%	1	8% > Fee ≥ 7%	1	13% > Fee ≥ 11%	1
11% > Fee ≥ 9%	2	Fee < 7%	3	11% > Fee ≥ 9%	2
9% > Fee ≥ 7%	3			Fee < 9%	4
7% > Fee ≥ 6%	5				
Fee < 6%	7				

*Table 11 HHFDC QAP: Developer's Fee as percentage of total project cost*

**Criterion 5: Project will be receiving project-based rental assistance subsidies for the first time**

**Total Points: 7 points**

In this criterion, projects receiving, for the first time, project based rental assistance subsidies.

**Criterion 6: State/Local Government Support**

**Total Points: 6 points**

The following criterion's maximum award is six (6) points. In reference to the QAP, the project will be receiving a permanent below market loan or grant from a State or local governmental agency other than HHFDC or a lease from a government agency (also includes HHFDC). There are three (3) subcategories in which the project may score points in this criterion:

1. The project has received a commitment for a permanent below market loan, or grant, or a commitment of less than 10% of the total development cost.  
**(3 points)**
2. The project has received a commitment for a permanent below market loan, or grant, or a commitment of greater than 10% of the total development cost.  
**(6 points)**

3. The project has received a lease from a government agency (including HHFDC).  
(3 points)

### **Criterion 7: Energy Efficient and Green Building**

#### **Total Points: 4 points**

The QAP encourages applicants to pursue sustainable building practices by promoting smart growth, energy and water conservation and operational savings in affordable housing design in this criterion. There are different categories in this segment, but projects may only score points in one category. Applicants aiming for more than one category will not be considered in the application process of being awarded LIHTC.

EPA Energy Star v.3	Enterprise Green Communities	USGBC LEED for Homes – v4 HD&C	National Green Building Standard (NAHB)	No. Points
X	Certified	Certified	Bronze	1
		Silver	Silver	2
		Gold	Gold	3
		Platinum	Emerald	4

*Table 12 Energy Efficient and Green Building Criterion*

### **Criterion 8: Project location and market demand**

#### **Total Points: 6 points**

Depending on the location of the project, HHFDC's evaluation will factor in, but not limited to, the following: Project is in a country's urban core/district (preference) versus rural district and is accessible to employment opportunities and shopping; and recreational, medical, and educational facilities are in the immediate vicinity of the project site.

The following table shows how the points may be allocated, with a maximum of six (6) points attainable.

Located in a County's urban core	4 points
Located in an urbanized area	3 points
Located in a master planned community	2 points
Located in a rural district in proximity to employment opportunities and medical and educational facilities	1 point
Project may earn two additional points for availability of a mass transit station/stop within ½ mile. For Oahu, the term "mass transit" is exclusive to rail. For the neighbor islands, the term "mass transit" is not exclusive to rail.	2 points

*Table 13 HHFDC QAP: Project location and market demand criterion*

### **Criterion 9: Developer experience**

#### **Total Points: 7 points**

In reference to the QAP, the system for scoring points in this criterion is straightforward:

1. Number of LIHTC Placed in Service by the Project Owner (General Partner/Managing Member/Developer);

Projects Placed in Service	Points
None	0
1 – 5	1
6+	2

*Table 14 HHFDC QAP: Developer Experience (anywhere)*

2. Number of LIHTC Placed in Service in Hawai'i by the Project Owner (General Partner/Managing Member/Developer);

Projects Placed in Service	Points
None	0
1 – 3	1
4+	2

*Table 15 HHFDC QAP: Developer Experience (in Hawai'i)*

3. Number of LIHTC projects managed by the Management Agent;



Projects Managed	Points
None	0
1 – 5	1
6+	2

*Table 16 HHFDC QAP: Management Experience (Number of LIHTC projects managed in Hawai'i)*

4. Number of LIHTC projects located in the State of Hawai'i managed by the management Agent;

**Criterion 10: Project will provide low-income units for a longer period than is required under Section 42 IRC**

**Total Points: 7 points**

In this criterion of the QAP, applicants willing to commit an additional use period beyond the initial 15-year LIHTC compliance period (collectively the Extended Use Period) will be awarded points based on the table below. This election shall be recorded in the Restrictive Covenant Document.

Table 16 exemplifies points awarded:

<b>Total Extended Use Period (Total Length of Affordability Commitment):</b>	<b>Points</b>
61 years or more	7 points
55 to 60 years	4 points
50 to 54 years	3 points
45 to 49 years	2 points
40 to 44 years	1 point
Less than 40 years	0 points

*Table 17 HHFDC QAP: Provide low-income units for longer period than required under Section 42 of IRC*

**Criterion 11: Project will give preference to tenant populations**

**Total Points: 2 points**

If applicants provide affordable housing that include larger units available to individuals with children or families, they are eligible for up to two (2) points in this criterion. Requirements are as follows:

Based on the QAP, Projects providing units that are 2-bedrooms or larger for at least 20% of all low-income units may earn 1 to 2 points according to the following schedule:

20% to 39% of the total units	<b>1 point</b>
40% or more of the total units	<b>2 points</b>

**Criterion 12: Project serving tenants with special housing needs**

**Total Points: 2 points**

According to the QAP, "special housing needs" is defined as persons who suffer from social problems, age or physical or mental disabilities and impede their ability to live independently, but such disabilities can be improved by given more suitable housing conditions. Individuals with special housing needs include those with physical or mental disabilities or persons who are homeless.

**Criterion 13: Project will provide a greater percentage of low-income units than required under Section 42 IRC**

**Total Points: 10 points**

The following criterion allow for applicants to receive points by providing a preference to lower income tenants based on the table below. Projects may score multiple times under the "Percent of Income Targeted Units" category. Based on the QAP, however, projects may only score once under a specific "Area Median Income" category. The highest possible award in this criterion is ten (10) points.

Version C-4		Percent of Area Median Income			
		60%	50%	40%	30%
Percent of Income Targeted Units to Total LIHTC Units	80%	6.25	7.75	9	10
	70%	5.25	6.75	8	9
	60%	4.25	5.75	7	8
	50%	3.25	4.75	6	7
	40%	2.25	3.75	5	6
	30%	1.25	2.75	4	5
	20%	0.25	1.75	3	4
	10%	0	0.75	2	3

Table 18 HHFDC QAP: Percentage of units based on target AMI

In reference to the QAP, the table 18 is an example scoring sheet based on the previous table above:

Project		60% AMI	50% AMI	40% AMI	30% AMI	Points
Alpha	Percent of Income Targeted Units to Total LIHTC Units	100%				6.25
Bravo			100%			7.75
Charlie		50%	50%			8.
Delta		50%		50%		9.25
Echo		50%	30%	10%	10%	10
Foxtrot		80%	20%			8
Golf		80%	10%		10%	10

Table 19 HHFDC QAP: Example scoring sheet for projects (Alpha, Bravo, Charlie, etc.)

Lastly, the income restrictions must be included as part of the declaration of land use restrictive covenants based on the unit count.

**Criterion 14: Project is participating with a local tax-exempt organization and is sponsored by a qualified non-profit, as defined in Section 42 IRC.**

**Total Points: 3 points**

Defined in Section 42 of the IRC, the Project must involve a Qualified Non-Profit Organization. Furthermore, the Qualified Non-Profit Organization is to own an interest in the project, either directly or through a partnership and materially participate (within the meaning of Section 469(h) of the IRC in the development and operation of the project throughout the Extended Use Period).

**Criterion 15: Project offering tenants an opportunity for home ownership**

**Total Points: 0 or 1 point**

This criterion allows one (1) point to be awarded if the Project offers tenants an opportunity for home ownership. There must be a plan discussing how the project will offer the units for homeownership to tenants.

If the answer is NO	0 points
If the answer is YES	1 point

## Appendix B: Architect as Developer Soft Cost

### Consolidation

#### Overview

Calculation of consolidating the architect and developer soft costs



Savings made within the outlined soft costs between the Architect Fee and the Developer Fee

## Direct savings in total cost of development

Calculation of Architect and Developer soft cost savings from consolidation

### Architect Fee

Total Architect Fee	\$1,697,898
Total Profit (20%)	\$339,580
Total Hard Cost (30%)	\$509,369
Total Soft Cost (20%)	\$848,949

### Developer Fee

Total Developer Fee	\$2,359,000
Total Profit (48%)	\$1,140,000
Total Hard Cost (29%)	\$555,100
Total Soft Cost (22%)	\$663,900

Architect Soft Costs	\$848,949
Developer Soft Costs	\$663,900
<b>Total Soft Costs</b>	<b>\$1,512,849</b>

\* Arch and Dev as separate entities

<b>Architect-Developer Soft Costs</b>	<b>\$1,168,549</b>
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\* Arch and Dev as combined entities

Arch Developer Soft (separate)	\$1,512,849
Arch Developer Soft (combined)	\$1,168,549
<b>Total Soft Cost Savings</b>	<b>\$344,300</b>

<b>Total Percentage Savings</b>	<b>23%</b>
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**Total of 23% or \$344,300 can be reduced from consolidating architect and developer soft costs**

### Notes

Soft Cost: Administration fees including clerical assistant, office space cost, etc.

Hard Cost: Cost to pay workers for tasks that include labor for each profession, as opposed to just physical construction cost. Example: Architect hard cost includes actual drawing

Arch: Architect

## Direct savings in total cost of development

Detailed calculation of consolidating soft costs between Architect and Developer

Separate Entities		Architect	Developer
Employees with Benefits		\$84,375	\$84,375
Office Space	\$10,000	\$10,000	
Telephone	\$3,000	\$3,000	
Equipment	\$10,000	\$5,000	
Printing and Supplies	\$5,000	\$5,000	
Travel and Training	\$5,000	\$5,000	
Professional Services	\$30,000	\$20,000	
<b>Subtotal Overhead</b>	<b>\$53,000</b>	<b>\$48,000</b>	
70% Inflation	\$37,100	\$83,600	
Subtotal w/inflation + Employees	\$174,475	\$165,975	
<b>Total Cost over 4 years</b>	<b>\$697,900</b>	<b>\$663,900</b>	
<b>Additional Arch Soft Costs</b>	<b>\$151,049</b>		
<b>Total Architect and Developer (separate)</b>		<b>\$1,512,849</b>	

Combined Entities		Architect	Developer
Employees with Benefits		Architect as Developer	
		\$84,375	
Office Space		\$20,000	
Telephone		\$4,000	
Equipment		\$12,000	
Printing and Supplies		\$7,000	
Travel and Training		\$7,000	
Professional Services		\$40,000	
<b>Subtotal Overhead</b>		<b>\$90,000</b>	
70% Inflation		\$70,700	
Subtotal w/inflation + Employees		<b>\$273,075</b>	
<b>Total Cost over 4 years</b>		<b>\$1,092,300</b>	
<b>Additional Arch Soft Costs</b>		<b>\$151,049</b>	
<b>Total Architect as Developer (combined)</b>		<b>\$1,168,549</b>	

Total Cost of Development	\$39,957,950
<b>Total Savings (if entities combined)</b>	<b>\$344,300</b>

**Total savings of \$344,300 can be reduced from the total cost of development**

### Notes

Soft Cost: Administration fees including clerical assistant, office space cost, etc.

Employee with benefits: Includes Controller, Clerk, Bookkeeper

Additional Architect Soft Costs: Soft costs included in the Architect team (project architect, junior architect, draftsman), benefits, healthcare, etc.

Architect Fee Calculation: 5% of total development cost \$39.96 million

Developer Soft Cost Calculation: See Appendix D for Developer Operation Budget total

## **Appendix C: Architect as Developer BIM savings**

### **Overview**

Calculation of choosing Building Information Modeling (BIM) as the architectural drawing platform



## Cost savings: CAD vs BIM

Calculation of CAD method vs BIM method of Architect Fee

Architect Fee	\$1,697,898
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CAD Method		
Schematic Design	\$237,706	14%
Design Development	\$339,580	20%
Construction Documents	\$747,075	44%
Bidding and Negotiation	\$101,874	6%
Construction Phase	\$271,664	16%
<b>Total</b>	<b>\$1,697,898</b>	

BIM Method		
Schematic Design	\$424,474	25%
Design Development	\$424,474	25%
Construction Documents	\$424,474	25%
Bidding and Negotiation	\$101,874	6%
Construction Phase	\$288,643	17%
<b>Total</b>	<b>\$1,663,940</b>	

CAD Method	\$1,697,898
BIM Method	\$1,663,940
<b>Total Savings</b>	<b>\$50,937</b>
<b>Percentage of Savings</b>	<b>3%</b>

\* Percentage of Architect Fee

**Total savings if Architect as Developer chooses BIM: \$50,937 or 3% of Architect Fee**

### Notes

CAD: Computer Aided Design

BIM: Building Information Modeling

Conventional Percentage of Architect Fee<sup>85</sup>

Schematic Design	12-25%
Design Development	12-25%
Construction Documents	35-45%
Bidding and Negotiation	2.5-6.5%
Construction Phase	25-35%

BIM Percentage of Architect Fee<sup>86</sup>

Schematic Design	25%
Design Development	25%
Construction Documents	25%
Bidding and Negotiation	2.5-6.5%
Construction Phase	25-35%

<sup>85</sup> "Determining the Cost of Architectural Services." Manitoba Association of Architects. 2018. Accessed April 2, 2019. [https://www.mbarchitects.org/cost\\_of\\_architectural\\_services.php](https://www.mbarchitects.org/cost_of_architectural_services.php).

<sup>86</sup> Ibid.

## **Appendix D: Hypothetical Affordable Housing with Crowdfunding component**

### **Overview**

Calculation of finances for a hypothetical mid-rise affordable rental housing project

#### **General Info**

Total Units: 100

Target Market: Households at 60% Area Median Income (AMI) or less<sup>87</sup>

Location: Honolulu, HI

**Total Development Cost: \$39,712,745**

Hard Cost: \$33,957,950

Soft Cost: \$5,754,795

\*Land acquisition cost not included

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<sup>87</sup> 100% AMI in Honolulu: Household of 4 person = \$96,000

# Unit Configuration

How to calculate the unit configuration

		Percent of Area Median Income			
		60%	50%	40%	30%
Percent of LIHTC Units to TOTAL Units	80%	6.25	7.75	9	10
	70%	5.25	6.75	8	9
	60%	4.25	5.75	7	8
	50%	3.25	4.75	6	7
	40%	2.25	3.75	6	6
	30%	1.25	2.75	5	5
	20%	0.25	1.75	3	4
	10%	0	0.75	2	3

## HHFDC 2018/2019 Qualified Allocation Plan<sup>88</sup>, page 19 – Criterion 13

### Max Possible Points: 10 points

Unit Configurations may vary. The unit count is based on percentage of LIHTC units to the Total units of the project. HHFDC<sup>89</sup> encourages mixture of units with targeted units of less than 60% AMI.<sup>90</sup>

Example: If you have 80 LIHTC<sup>91</sup> units (80%) out of 100 total units which target 60% AMI, you are eligible for 6.25.

<sup>88</sup> Qualified Allocation Plan: Used by HHFDC to determine LIHTC eligibility

<sup>89</sup> HHFDC: Hawai'i Housing Finance and Development Corporation

<sup>90</sup> AMI: Area Median Income. Statistics generated by HUD to determine eligibility of applicants for federal housing programs

<sup>91</sup> Low-Income Housing Tax Credit

## Unit Configuration

Calculation for the unit configuration of the hypothetical mid-rise affordable rental housing project

Target Market	# of Units	% of Units
30% AMI Units	6	6%
50% AMI Units	44	44%
60% AMI Units	49	49%
Property Manager Unit	1	1%
<b>Total</b>	<b>100</b>	<b>100%</b>

**This configuration will receive the maximum 10 points on the HHFDC QAP.** <sup>92</sup>

### Notes

Annual Income Limits – Determined by HUD 2017<sup>93</sup>

Annual Income	1 Person	4 Persons
30% AMI Limit	\$24,000	\$35,000
50% AMI Limit	\$40,800	\$58,300
60% AMI Limit	\$49,050	\$70,000

<sup>92</sup> Hawai'i Housing Finance and Development Corporation, 2018/2019 Qualified Allocation Plan

<sup>93</sup> HUD: U.S. Department of Housing and Urban Development

## Construction Cost (Hard Costs)

Calculation for construction cost of the project, based on cost of \$445 per square feet

Target Market	# of Units	Total Sq Ft.
30% AMI Units (300 sf/unit)	6	1,800
50% AMI Units (500 sf/unit)	44	22,000
60% AMI Units (700 sf/unit)	49	34,300
Property Manager Unit (600 sf/unit)	1	600
<b>Total (Gross Square Footage for all Units)</b>		<b>58,700</b>

Gross Sq Ft for all Units	58,700
Circulation Multiplier (30%)	17,610
<b>Total</b>	<b>76,310</b>

<b>Cost per square foot (Hawaii)</b>	<b>\$445</b>
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<b>Total Construction Cost</b>	<b>\$33,957,950</b>
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**Total Construction Cost: \$33,957,950**

### Notes

Cost per square feet: In Hawai'i, average cost for multifamily development is \$445/sq. ft.<sup>94</sup>

AMI: Area Median Income

Hard Cost: Any cost involved with the physical construction of a project

Circulation Multiplier: Includes circulation area, elevator lobby, staircase, hallways

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<sup>94</sup> Magin, Janis L. "Building a House in Honolulu Costs Nearly Twice as Much as Chicago, Report Shows." Bizjournals.com. July 6, 2017. Accessed April 2, 2019. <https://www.bizjournals.com/pacific/news/2017/07/05/building-a-house-in-honolulu-costs-nearly-twice-as.html>.

## Architect and Engineer Fees (Soft Costs)

Calculation of architect and engineer fees of the project

Total Construction Cost	\$33,957,950
Architect (% of Construction Cost)	5%
Fee	<b>\$1,697,898</b>
MEP (% of Construction Cost)	1%
Fee	<b>\$339,580</b>
Structural Engineer (% of Construction Cost)	2%
Fee	<b>\$679,159</b>
Civil Engineer (% of Construction Cost)	1%
Fee	<b>\$339,580</b>
Environmental Engineer (% of Construction Cost)	1%
Fee	<b>\$339,580</b>
Total Consultant Fees	<b>\$3,395,795</b>

**Total Architect and Engineer Fees: \$3,395,795**

### Notes

Soft Costs: Any costs that are not considered to be direct construction costs. Includes Architectural and Engineering Fees, pre-construction costs, etc.

MEP: Mechanical, Electrical, Plumbing

Environmental Engineer: Uses the principles of engineering, soil science, biology, and chemistry to develop solutions to environmental problems

Architect Fee: 5% - 15% for new construction<sup>95</sup>

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<sup>95</sup> "How Much Does an Architect Cost?" Homeadvisor.com. Accessed April 2, 2019. <https://www.homeadvisor.com/cost/architects-and-engineers/hire-an-architect/>.

MEP Fee: 1% - 2.5% of construction cost<sup>96</sup>

Structural Engineer: 1% - 2.5% of construction cost<sup>97</sup>

Civil Engineer: 1% - 2.5% of construction cost<sup>98</sup>

Environmental Engineer: 1% - 2.5% of construction cost<sup>99</sup>

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<sup>96</sup> "How Much Does an Engineer Charge for Their Services?" NorthStar, NorthStar, [www.northstareng.com/how-much-does-an-engineer-charge-for-their-services/](http://www.northstareng.com/how-much-does-an-engineer-charge-for-their-services/).

<sup>97</sup> Ibid.

<sup>98</sup> Ibid.

<sup>99</sup> Ibid.

## Developer's Operation Budget (Soft Costs)

Calculation of Developer's estimated operation budget for the duration of the project

Multifamily Development w/ LIHTC (100 units per year)

### **Staff (national average salaries taken from *www.glassdoor.com*, 2018)**

Executive director	(0.33 FTE @ \$130,000/FTE)	\$	42,900
Project Manager	(1.00 FTE @ \$95,00/FTE)	\$	95,000
Controller	(0.25 FTE @ \$94,264/FTE)	\$	37,500
Clerical Assistant	(0.50 FTE @ \$40,000/FTE)	\$	20,000
Bookkeeper	(0.25 FTE @ \$40,000/FTE)	\$	10,000
<b>Total Staff Salaries</b>		<b>\$</b>	<b>205,400</b>

<b>Benefits @ 25%</b>	<b>\$</b>	<b>51,350</b>
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### **General Overhead (Prorated to program)**

Office space & Utilities	\$	10,000
Telephone	\$	3,000
Equipment	\$	5,000
Printing and supplies	\$	5,000
Travel & Training	\$	5,000
Professional Services (auditors, public relations, fund raising)	\$	20,000
Total General Overhead	\$	48,000
<b>Total General Overhead</b>		<b>\$ 48,000</b>

Inflation from 1999 to 2018	70%
Total General Overhead (CPI Inflation Calculator, 1999 to 2018)	\$ 81,600

### **Summary**

Sub-total Staff Salaries	\$	205,400
Benefits @ 25%	\$	51,350
Total General Overhead w/ 10% inflation	\$	48,000
<b>GRAND TOTAL Operational Cost (per year)</b>		<b>\$ 304,750</b>

Typical Project Duration (years):	4
<b>Developer Operation Cost 4 years:</b>	<b>\$ 1,219,000</b>

**Total estimated Developer's Operation Budget: \$1,219,000**

### Notes

Developer's Operation Budget: Calculation based on budget template<sup>100</sup>

<sup>100</sup> "Developing Multifamily Housing With New Construction." The Enterprise Foundation. 1999. Accessed April 2, 2019. <https://www.enterprisecommunity.org/download?fid=911&nid=4233>.



Inflation Calculation: 70% increase from 1999 to 2018<sup>101</sup>

Project Duration: Timeframe varies, could take years for permitting process, environmental assessment, construction period, etc.

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<sup>101</sup> "CPI Inflation Calculator." U.S. Bureau of Labor Statistics. Accessed April 2, 2019. <https://data.bls.gov/cgi-bin/cpicalc.pl>.

## Developer's Fee

Calculation of the Developer's Fee by electing to limit maximum fee to 7% of the Total Construction Cost

Total Construction Cost	\$33,957,950
<b>Developer's Fee (% of Construction Cost)</b>	7%
<b>Fee</b>	<b>\$2,359,000</b>

**Total Developer's Fee: \$2,359,000**

Developer's Fee as 7% of the Total Construction Cost allows for high eligibility for receiving LIHTC

### Notes

Developer's Fee: Includes overhead, management fee, consultant fee, etc. Not included – Architecture, Engineering, Accounting, and Legal Fees

Developer Fee is subject to maximum threshold cap of 15% out of the total development cost. The applicant elects to limit the total Developer Fee as a percentage of the development cost (excluding developer fee) as presented in the application.<sup>102</sup>

Applicant will be scored based on the following table:

Fee	Points
15% > Fee > 13%	0
13% > Fee > 11%	1
11% > Fee > 9%	2
9% > Fee > 7%	3
7% > Fee > 6%	5
Fee < 6%	7

This project is eligible for 5 out of 7 points.

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<sup>102</sup> Hawai'i Housing Finance and Development Corporation, 2018/2019 Qualified Allocation Plan

## Rent Roll

Calculation of the Rent Roll (the total amount of rent received from tenants of the project)

Target Market	Units	Annual Income (4 Persons)	30% Annual Net Income	Max Rent per unit (Monthly)	Total Rent Roll (Monthly)
30% AMI Units	6	\$35,000	\$10,500	\$875	\$5,250
50% AMI Units	44	\$58,300	\$17,490	\$1,458	\$64,130
60% AMI Units	49	\$70,000	\$21,000	\$1,750	\$85,750
Property Manager Unit	1	-	-	-	-
<b>Total</b>	<b>100</b>				<b>\$155,130</b>

**Total Rent Roll: \$155,130**

### Notes

HUD: U.S. Department of Urban Development

30% Annual Net Income: Rent limit is determined by HHFDC 2018/2019 QAP, pg. 28 to be eligible for tax-credits

Annual Income Limit Amount: Determined by HUD 2017.<sup>103</sup> See table below:

Annual Income	1 Person	4 Persons
30% AMI Limit	\$24,000	\$35,000
50% AMI Limit	\$40,800	\$58,300
60% AMI Limit	\$49,050	\$70,000

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<sup>103</sup> HUD. "FY 2018 Multifamily Tax Subsidy Project Income Limits Summary." Low-Income Housing Tax Credits | HUD USER. Accessed December 11, 2018. [https://www.huduser.gov/portal/datasets/il/il2018/2018sum\\_mtsp.odn](https://www.huduser.gov/portal/datasets/il/il2018/2018sum_mtsp.odn).

## Net Operating Income (NOI)

Calculation for the monthly Net Operating Income of the project;  
Subtracting expenses from the Rent Roll

Total Rent Roll	\$155,130
Gross Effective Income (5% Vacancy Loss)	\$147,374
Total Maintenance and Operating Cost (40%) *Property Manager fees included, see notes	\$58,949
<b>Net Operating Income</b>	<b>\$88,424</b>

**Total Net Operating Income (Monthly): \$88,424**

### Notes

NOI: Net Operating Income

Gross Effective Income: Accounts for 5% of vacancy, 100% of units will not always be rented simultaneously

Total Maintenance and Operating Costs: Includes, but not limited to property management fees, maintenance over time, operating cost for project

Property Manager Fee Calculation:

Rule of thumb for 50-100 unit apartment is 3% - 5% of income. Example: 5% of \$147,374 Gross Effect Income = \$7,396 per month.<sup>104</sup>

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<sup>104</sup> "Management Fees and Property Expenses Rules of Thumb." Jake & Gino. April 13, 2016. Accessed April 2, 2019. <https://jakeandgino.com/the-three-step-repositioning-process-for-adding-value-to-your-multifamily-properties/>.

# Capital Stack

The structure of the Capital Stack for the project; Divided into 4 total categories



## 1. Bank Loan

-Bank Loan, based on NOI



## 2. LIHTC

-Government Subsidy  
-Low-Income Housing Tax Credits



## 3. Grants & Trusts

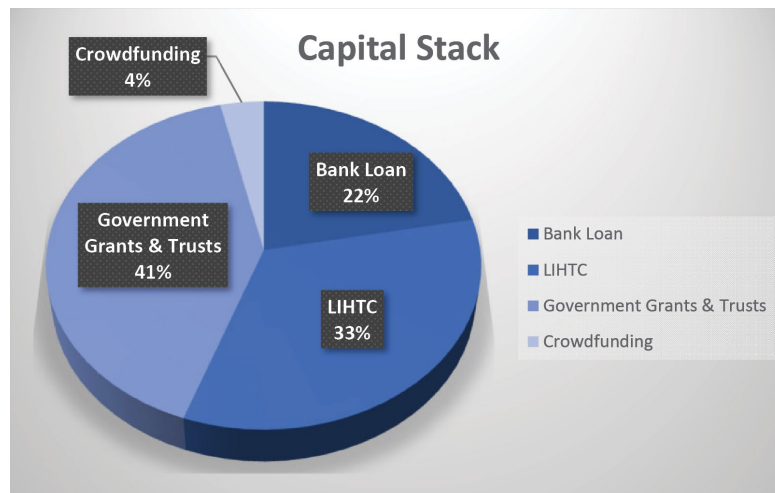
-Government Subsidy  
-Brief explanation of available funds in Hawaii  
-Case studies used to determine percentage available



## 4. Crowdfunding

-Method  
-Explanation of equity-based model

1. Bank Loan	\$8,717,838
2. LIHTC	\$13,311,516
3. Grants & Trusts	\$16,282,225
4. Crowdfunding	\$1,401,165
<b>Total Project Cost</b>	<b>\$39,712,745</b>



## 1. Bank Loan

Calculation of the bank loan, debt service leveraged from the project  
Net Operating Income (NOI)

Net Operating Income	\$88,424
Debt Coverage Ratio	1.50*
Income Available for Debt Service	\$58,949
<b>Total Mortgage</b> Loan Terms: 30 years, 7% interest	<b>\$8,717,838</b>

**Total Mortgage: \$8,717,838**

Percentage of Capital Stack: 22%

### Notes

NOI: Net Operating Income

Debt Coverage Ratio (DCR): measure of the cash flow available to pay current debt obligations

Debt Service: cash required to cover the repayment of interest and principal on a debt based on loan terms

Income Available for Debt Service Calculation: NOI/DCR

Total Mortgage Calculation: Online Mortgage Calculator used to determine mortgage for loan term of 30 years with 7% interest.<sup>105</sup>

Debt Coverage Ratio: The Project is required to evidence a Debt Service Ratio of no less than 1.15x on all hard debt service requirements for the duration of the initial 15-year LIHTC compliance period.<sup>106</sup>

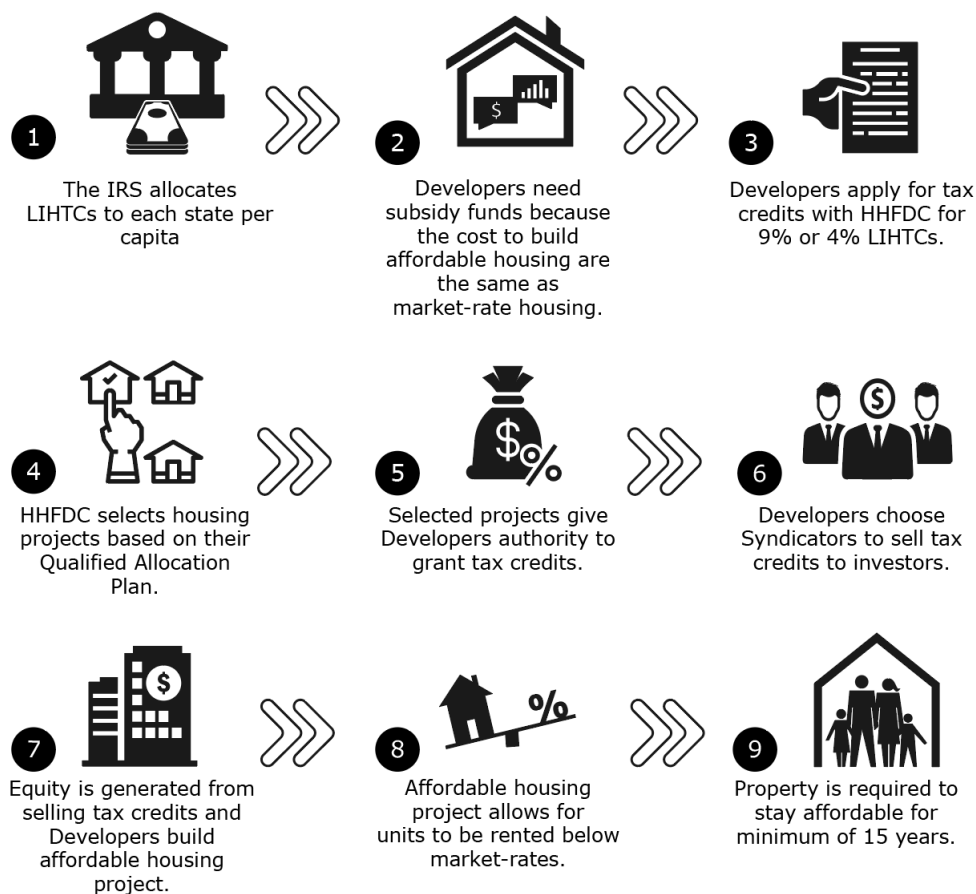
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<sup>105</sup> Jeacle, Karl. Karl's Mortgage Calculator, [www.drccalculator.com/mortgage/](http://www.drccalculator.com/mortgage/).

<sup>106</sup> Hawai'i Housing Finance and Development Corporation, 2018/2019 Qualified Allocation Plan

## 2. Low-Income Housing Tax Credits (LIHTC)

How it works



### Notes

IRS: Internal Revenue Service

HHFDC: Hawai'i Housing Finance and Development Corporation

QAP: Qualified Allocation Plan

9% Credits: Usually used for new construction, no tax-exempt bonds need

4% Credits: Typically required tax-exempt bonds with application

Syndicator: Intermediary who administers tax credit deals with investors (usually banks)

Applicants electing to commit to the affordability period beyond the 15-year compliance will be more eligible to receive tax-credits.<sup>107</sup>

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<sup>107</sup> Hawaii Housing Finance and Development Corporation, 2018/2019 Qualified Allocation Plan

## 2. Low-Income Housing Tax Credits (LIHTC)

Calculation of total equity received from LIHTC Credits

Total Development Cost (TDC)	\$33,957,950
LIHTC Credits Requested (49% of TDC)	\$16,639,396
Credit Rate	8%
Annual Tax Credit	\$1,311,152
Total Tax Credit for 10 years	\$13,311,516
Tax Credit Equity Price Per Credit	\$0.90
<b>Total Equity Received</b>	<b>\$11,980,365</b>

**Total equity from LIHTC: \$11,980,365**

Percentage of Capital Stack: 33%

### Notes

LIHTC: Low-income Tax Credits

Total Development Cost (TDC): Total Construction Cost without soft costs

Soft Costs: Any costs that are not considered direct construction costs. Includes Architectural and Engineering Fees, pre-construction costs, etc.

Credit Rate: The rate of credits to be received from requested amount of LIHTC

Tax Credit Equity Price per Credit: Price for each credit to be sold to investors. The 2018 average price is \$0.90.<sup>108</sup>

The project is more eligible to receive tax-credits if the Ratio between LIHTC Credits Requested (for 10 years)/Total Project Cost is less than 50%.<sup>109</sup> The ratio for this project is 49%, which maximizes its eligibility for tax-credits.

<sup>108</sup> Novogradac & Company LLP, [www.novoco.com/atom/175071](http://www.novoco.com/atom/175071).

<sup>109</sup> Hawai'i Housing Finance and Development Corporation, 2018/2019 Qualified Allocation Plan



### 3. Grants and Trusts

8 Case Studies similar in nature to the project used to benchmark the average range for uses of grants and trusts within this project<sup>110</sup>

1. Kalepa Village Phase 2

- Location: Honolulu, HI
- Units: 180
- Grants and Trusts (Percent of Project Cost): 24%

2. Hualalai Housing Project: Phase 2

- Location: Kailua Kona, HI
- Units: 36
- Grants and Trusts (Percent of Project Cost): 27%

3. Ola Ka 'Ilima Artspace Lofts

- Location: Honolulu, HI
- Units: 84
- Grants and Trusts (Percent of Project Cost): 35%

4. Palehu Terrace II

- Location: Makakilo, HI
- Units: 64
- Grants and Trusts (Percent of Project Cost): 42%

5. Residence at Kaneohe

- Location: Kaneohe, HI
- Units: 74
- Grants and Trusts (Percent of Project Cost): 51%

6. Hale Makana O Waia-le

- Location: Maui, HI
- Units: 200
- Grants and Trusts (Percent of Project Cost): 56%

7. Na Hale O Wainee Resource Center

- Location: Lahaina, HI
- Units: 96
- Grants and Trusts (Percent of Project Cost): 56%

8. Hale Ulu Hou Phase 3

- Location: Hilo, HI
- Units: 18
- Grants and Trusts (Percent of Project Cost): 58%

**Percentage Range of Grants and Trusts in Capital Stack: 24% - 58%**

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<sup>110</sup> Resource Guide For Affordable Housing On The Islands Of Hawaii. Ebook. Rural Community Assistance Corporation, 2017. <https://www.rcac.org/wp-content/uploads/2014/12/Hawaii-Resource-Manual-for-web.pdf>.

### 3. Grants and Trusts

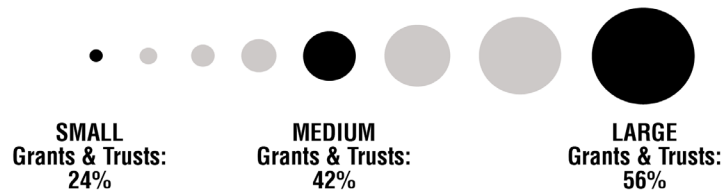
Applying the benchmark range for use of grants and trusts from 8 Case Studies similar in nature to the project

<b>Total Project Cost</b>	<b>\$39,712,745</b>
---------------------------	---------------------

<b>Source of Fund</b>	<b>Amount</b>	<b>% of Project</b>
State of Hawaii Grant	\$3,177,020	8%
HHFDC Rental Housing Revolving Funds	\$5,162,657	13%
C&C of Honolulu Affordable Housing Funds	\$1,787,074	5%
Hula Mae Multi-Family Revenue Bond Program	\$4,169,838	11%
Hawaii Rental Housing System Revenue Bond	\$1,985,637	5%
<b>Total</b>	<b>\$16,282,225</b>	<b>41%</b>

**Total Grants and Trusts: \$16,282,225**

Percentage of Capital Stack: 41%



**This project falls under the medium range of data from the 8 case studies**

#### Notes

State of Hawai'i Grant: Benchmarked in reference to Case Study 2 Ola Ka 'Ilima Artspace Lofts to be less than \$3,350,000

HHFDC: Hawai'i Housing Finance and Development Corporation

HHFDC Rental Housing Revolving Funds: Benchmarked in reference to Case Study 2 Ola Ka 'Ilima Artspace Lofts to be less than \$10,800,000

C&C of Honolulu: City and County of Honolulu

C&C of Honolulu HOME Block Grant: Allocation limit is \$3,000,000 per year

Hula Mae Multi-family Revenue Bond Program: Can be used in conjunction with 4% LIHTC. In 2011, two affordable housing projects received a total of \$25,000,000.

## 4. Crowdfunding

Calculation to determine Crowdfunding Goal after factoring other sources of funds into the Capital Stack

<b>Total Project Cost</b>	<b>\$39,712,745</b>
---------------------------	---------------------

Bank Loan	\$8,717,838
LIHTC	\$13,311,516
Grants & Trusts	\$16,282,225
<b>Total</b>	<b>\$38,311,580</b>

Total Project Cost	\$39,712,745
Bank Loan, LIHTC, Grants & Trusts	\$38,311,580
<b>Total Gap Finance (Crowdfunding Goal)</b>	<b>\$1,401,165</b>

**Total Crowdfunding: \$1,401,165**

Percentage of Capital Stack: 4%

NOTE: Amount/percentage of Crowdfunding amount will vary and depends on the Developer's ability to assemble LIHTC, bank loan, and grants & trusts.

### Notes

LIHTC: Low-Income Housing Tax Credits

Gap Finance: remaining amount subtracted from Total Project Cost minus other funds that have been assembled beforehand

Crowdfunding Goal: amount needed for a Crowdfunding campaign

## 4. Crowdfunding

Calculation to determine the Pledge amount needed from each Backer

Crowdfunding Goal	\$1,401,165
-------------------	-------------

Crowdfunding # of Backers	1,000
<b>Pledge needed from each person</b>	<b>\$1,401</b>

**Total Pledge amount needed from each Backer: \$1,401**

NOTE: Pledge will be evenly divided into 1,000 Backers

### Notes

Crowdfunding Goal: amount needed for a Crowdfunding campaign

Backer: Person who contributes to a Crowdfunding campaign

Pledge: Contribution to Crowdfunding goal

Crowdfunding number of Backers: 83% used as benchmark to determine 1,000 Backers from Crowdsociety's data of 100 Architecture Projects which ranged from 72 to 1,200 people.<sup>111</sup>

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<sup>111</sup> "100 Projects of Crowdfunding in Architecture." CrowdSociety. May 21, 2015. Accessed April 2, 2019.  
[http://crowdsociety.org/index.php/100\\_projects\\_of\\_crowdfunding\\_in\\_architecture](http://crowdsociety.org/index.php/100_projects_of_crowdfunding_in_architecture).

## Equity-based Crowdfunding Model

Calculation to determine the Return for Backers from the Net Operating Income (NOI)

Net Operating Income (monthly)	\$88,424
Debt Service (Paid to Bank Loan in Capital Stack)	\$58,949
Cash After Debt Service (monthly)	\$29,475

Disbursed to Backers (Monthly)	\$29,475
Disbursed to Backers (Yearly)	\$353,696

Crowdfunding # of Backers	1,000
---------------------------	-------

Disbursed to each Backer (Yearly)	\$354
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\*Principal only, interest not included in calculation

Disbursed to each Backer after 10 years	\$3,540
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\*Initial Pledge paid back within first 4 years

Initial Pledge to Crowdfunding Goal	\$1,401
-------------------------------------	---------

<b>Total Return on Investments after 10 years</b>	<b>\$2,136</b>
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**Total Return after 10 years: \$2,136**

### Notes

Debt Service: Cash required to cover repayment of bank loan (in capital stack)

Cash After Debt Service: Cash remaining after Debt Service is paid

Backer: Person who contributes to a Crowdfunding campaign

Pledge: Contribution to Crowdfunding goal

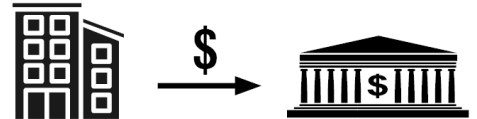
Return: Payment to Backer from investment towards Crowdfunding campaign

# Max Mortgage (Bank Loan) VS Deferred Mortgage

Comparison of utilizing Max Mortgage VS Deferred Mortgage

## Max Mortgage

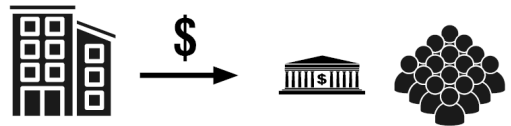
Net Operating Income (monthly)	\$88,424
Debt Coverage Ratio	1.15
Debt Service	\$76,891
Max Mortgage (30 years, 7% interest)	\$11,423,375



**VS**

## Deferred Mortgage

Net Operating Income (monthly)	\$88,424
Debt Coverage Ratio	1.50
Debt Service	\$58,949
Deferred Mortgage (30 years, 7% interest)	\$8,717,838



**Total variance: \$2,705,537**

**Difference between paying only the Bank VS paying the Bank and Backers**

## Notes

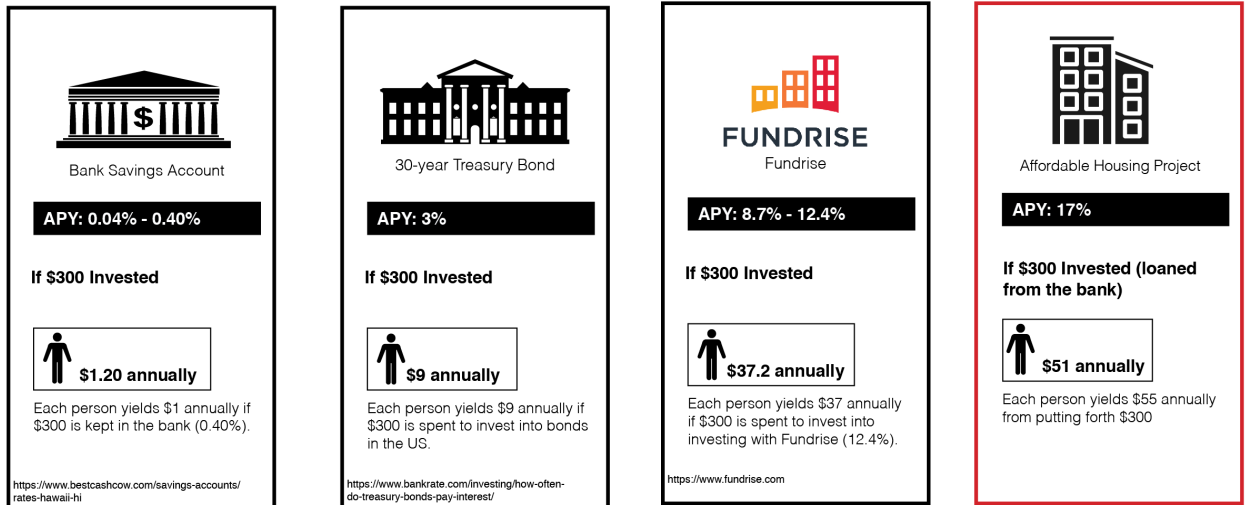
Debt Coverage Ratio (DCR): measure of cash flow available to pay current debt obligations

Debt Service: Cash required to cover repayment of bank loan (in capital stack)

Backer: Person who contributes to a Crowdfunding campaign

# Investment Comparison

Comparing crowdfunding equity-based model to existing investment options, basis of investing: \$300



**This Affordable Housing Project annual percentage yield outperforms available investing methods.**

## Notes

Annual Percentage Yield (APY): Annual rate of interest paid to investment

## Appendix E: Kakaako Project Case Study A

### Overview

An Affordable Housing Project in Kakaako currently under construction; Including information on the Capital Stack with a component replaced by Crowdfunding

#### General Info

Total Units: 80 Units

Target Market: Households at 60% Area Median Income (AMI) or less<sup>112</sup>

Location: Honolulu, HI

**Total Development Cost: \$56,126,670**

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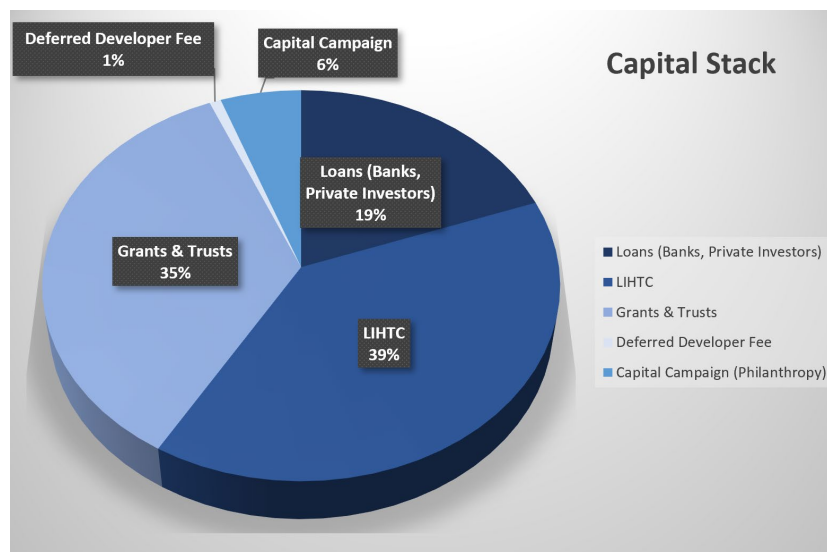
<sup>112</sup> 100% AMI in Honolulu: Household of 4 person = \$96,000



## Capital Stack

The structure of the Capital Stack for Case Study A; Divided into 5 total categories: Loans, LIHTC, Grants & Trusts, Deferred Developer Fee, Capital Campaign (Philanthropy)

Sources	Amount	Percent
Loans (Banks, Private Investors)	\$10,900,000	19%
LIHTC	\$21,935,877	39%
Grants & Trusts	\$19,750,000	35%
Deferred Developer Fee	\$440,793	1%
Capital Campaign (Philanthropy)	\$3,100,000	6%
<b>Total</b>	<b>\$56,126,670</b>	



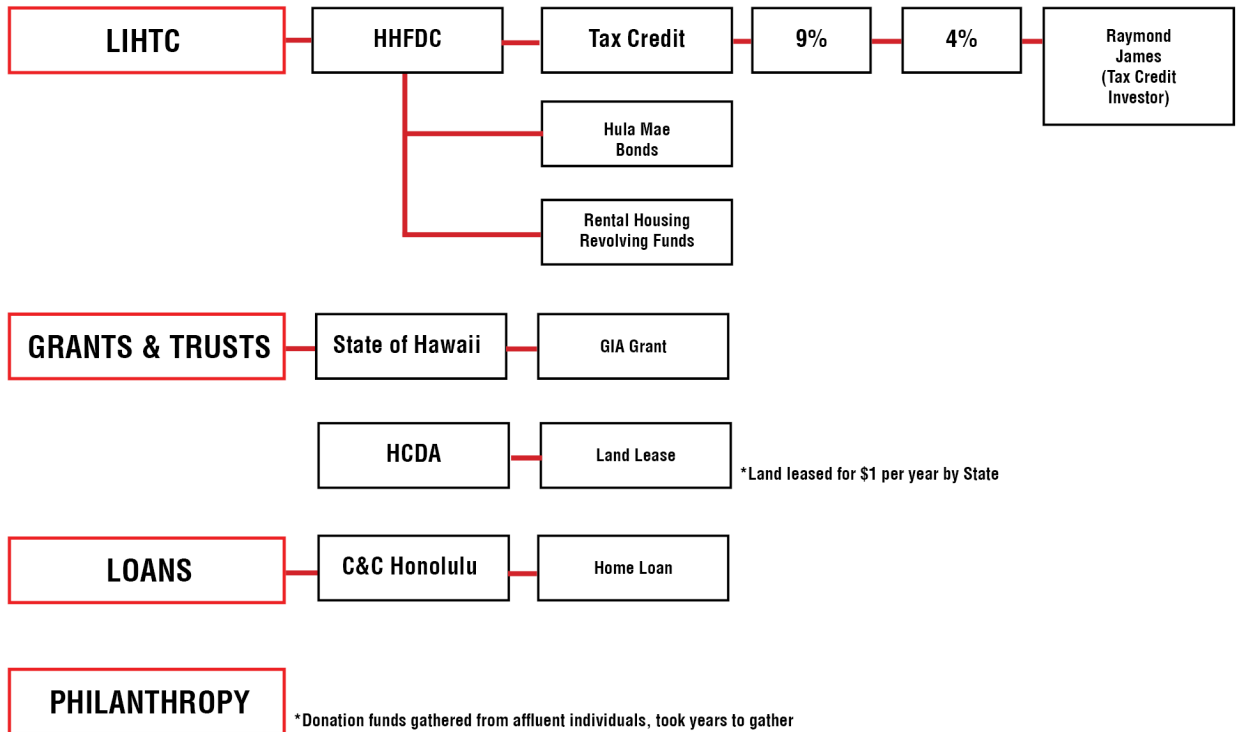
### Notes

LIHTC: Low-Income Housing Tax Credits

Philanthropy: Donation funds gathered from affluent individuals

# Financial Sources

A detailed structure of the Capital Stack for Case Study A



## Notes

LIHTC: Low-Income Housing Tax Credits

HHFDC: Hawai'i Housing Finance and Development Corporation

GIA Grant: State funds, Chapter 42F "Grants-In-Aid"

HCDA: Hawai'i Community Development Authority

C&C Honolulu: City and County of Honolulu

Philanthropy: Donation funds gathered from affluent individuals

## Capital Stack Alternative

Replace Capital Campaign with Crowdfunding

### Kakaako Project A Capital Stack

Sources	Amount	Percent
Loans (Banks, Private Investors)	\$10,900,000	19%
LIHTC	\$21,935,877	39%
Grants & Trusts	\$19,750,000	35%
Deferred Developer Fee	\$440,793	1%
<b>Capital Campaign (Philanthropy)</b>	<b>\$3,100,000</b>	<b>6%</b>
Total	\$56,126,670	

### Proposed Capital Stack

Sources	Amount	Percent
Loans (Banks, Private Investors)	\$10,900,000	19%
LIHTC	\$21,935,877	39%
Grants & Trusts	\$19,750,000	35%
Deferred Developer Fee	\$440,793	1%
<b>Arch/Developer Advantage + Crowdfunding</b>	<b>\$3,100,000</b>	<b>6%</b>
Total	\$56,126,670	

**Capital Campaign is replaced with Architect/Developer Advantage + Equity-based Crowdfunding.**

#### Notes

Capital Campaign (Philanthropy): Donation funds gathered from affluent individuals

Arch/Developer Advantage: Funds which may be saved if the Architect is the Developer

## Architect as Developer Advantage

Calculation to determine Crowdfunding Goal amount in Case Study A

Arch/Dev Soft Cost Consolidation	\$344,300
BIM savings	\$50,937
<b>Architect/Developer Advantage Amount</b>	<b>\$395,237</b>

Capital Campaign (Project A)	\$3,100,000
Architect as Developer Savings	\$395,237
<b>Remaining Amount (Crowdfunding Goal)</b>	<b>\$2,704,763</b>

**Crowdfunding Goal: \$2,704,763**

### Notes

Arch/Dev Soft Cost Consolidation: Amount of savings from consolidating Architect and Developer Soft Costs

BIM Savings: Savings that could be made from choosing the proper architecture platform

Crowdfunding Goal: amount needed for a Crowdfunding campaign

Backer: Person who contributes to a Crowdfunding campaign

Pledge: Contribution to Crowdfunding goal

## Crowdfunding Case Study A

Calculation to determine Pledge amount needed from each Backer

Crowdfunding Goal	\$2,704,763
-------------------	-------------

Crowdfunding # of Backers	1,000
<b>Pledge needed from each person</b>	<b>\$2,705</b>

**Total Pledge amount needed from each Backer: \$2,705**

NOTE: Pledge will be evenly divided into 1,000 Backers

### Notes

Crowdfunding Goal: amount needed for a Crowdfunding campaign

Backer: Person who contributes to a Crowdfunding campaign

Pledge: Contribution to Crowdfunding goal

Crowdfunding number of Backers: 83% used as benchmark to determine 1,000 Backers from Crowdsociety's data of 100 Architecture Projects which ranged from 72 to 1,200 people.<sup>113</sup>

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<sup>113</sup> "100 Projects of Crowdfunding in Architecture." CrowdSociety, 21 May 2015, crowdsociety.org/index.php/100\_projects\_of\_crowdfunding\_in\_architecture.

## Net Operating Income (NOI)

Calculation for the NOI from bank loan data in Case Study A

Total Mortgage	Loan Terms: 30 years, 7% interest	\$10,900,000	given variable
Debt Coverage Ratio		1.40	Assumed variable
Income Available for Debt Service		\$72,517	Assumed variable
<b>Net Operating Income</b>		<b>\$101,524</b>	

**Total NOI: \$101,524**

NOTE: Calculation of NOI needed to determine CADS

### Notes

NOI: Net Operating Income

Debt Coverage Ratio (DCR): measure of the cash flow available to pay current debt obligations

Debt Service: Cash required to cover repayment of bank loan (in capital stack)

Cash After Debt Service (CADS): Cash remaining after Debt Service is paid

Income Available for Debt Service Calculation:  $\text{NOI}/\text{DCR}$

Total Mortgage Calculation: Online Mortgage Calculator used to determine mortgage for loan term of 30 years with 7% interest.<sup>114</sup>

Debt Coverage Ratio: The Project is required to evidence a Debt Service Ratio of no less than 1.15x on all hard debt service requirements for the duration of the initial 15-year LIHTC compliance period.<sup>115</sup>

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<sup>114</sup> Jeacle, Karl. Karl's Mortgage Calculator, [www.drcalculator.com/mortgage/](http://www.drcalculator.com/mortgage/).

<sup>115</sup> Hawaii Housing Finance and Development Corporation, 2018/2019 Qualified Allocation Plan

## Equity-Based Crowdfunding Model

Calculation for to determine the Return for Backers from the Net Operating Income for Case Study A

Net Operating Income (monthly)	\$101,524	Assumed variable
Debt Service (Paid to Bank Loan in Capital Stack)	\$72,517	
Cash After Debt Service (monthly)	\$29,007	
Disbursable to Backers (Monthly)	\$29,007	
Disbursable to Backers (Yearly)	\$348,081	
Crowdfunding # of Backers	1,000	
Disbursed to each Backer (Yearly)	\$349	
Disbursed to each Backer after 10 years	\$3,490	
*Initial Pledge paid back within first 8 years		
Initial Pledge to Crowdfunding Goal	\$2,705	
<b>Total Return on Investments after 10 years</b>	<b>\$889</b>	
*10 year disbursement minus initial pledge		

**Potential Return to Backer after 10 years: \$889**

**13% Annual Percentage Yield**

### Notes

NOI: Net Operating Income

Debt Service: Cash required to cover repayment of bank loan (in capital stack)

Cash After Debt Service (CADS): Cash remaining after Debt Service is paid

Pledge: Contribution to Crowdfunding Goal

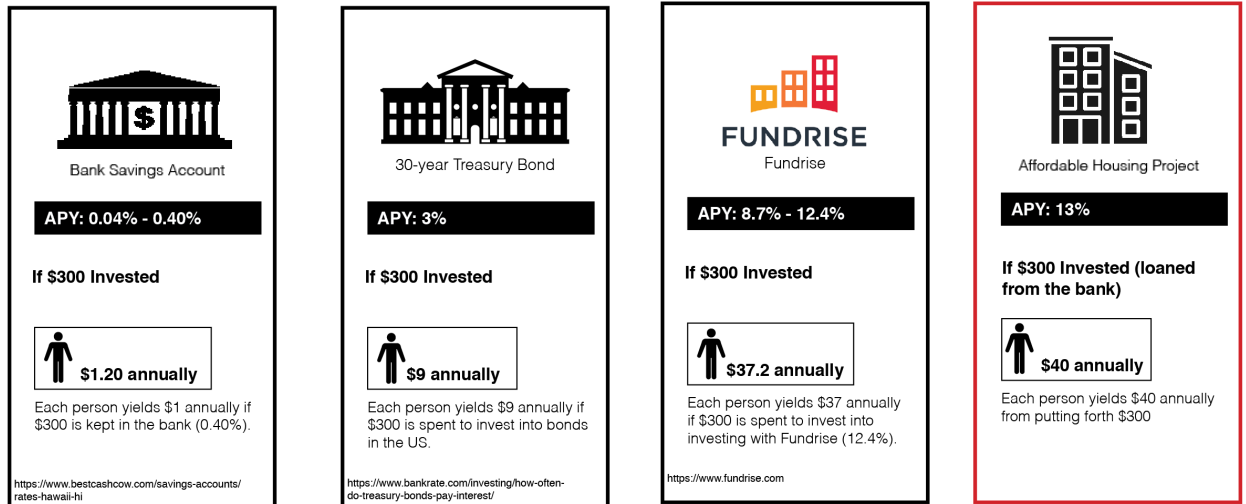
Backer: Person who contributes to Crowdfunding Goal

Return: Payment to Backer from investment towards Crowdfunding campaign

Cap Rate calculation: Yearly Disbursement / Initial Payment

# Investment Comparison

Comparing crowdfunding equity-based model to existing investment options, basis of investing: \$300



**In Case Study A, the annual percentage yield outperforms available investing methods.**

## Notes

Annual Percentage Yield (APY): Annual rate of interest paid to investment



## Appendix F: Kakaako Project Case Study B

### Overview

An Affordable Housing Project in Kakaako currently under construction; Including information on the Construction Pro Forma

#### General Info

Total Units: 111 Units

Target Market: Households at 60% Area Median Income (AMI) or less<sup>116</sup>

Location: Honolulu, HI

**Total Development Cost: \$27,000,000**

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<sup>116</sup> 100% AMI in Honolulu: Household of 4 person = \$96,000

# Construction Pro Forma: Variance Report

Comparison data in Case Study B between Initial Construction Cost and Actual Performance

		Estimate A		Estimate B	Variance
1 GENERAL REQUIREMENTS	\$	1,686,943	\$	2,416,971	\$ (730,028)
2 EXISTING CONDITIONS	\$	-	\$	22,250	\$ (22,250)
3 CONCRETE	\$	4,846,377	\$	1,372,621	\$ 3,473,756
2 REINFORCING	\$	1,091,998	\$	261,758	\$ 830,240
4 MASONRY	\$	19,670	\$	201,420	\$ (181,750)
5 METALS	\$	2,266,270	\$	3,925,712	\$ (1,659,442)
6 WOOD & PLASTICS	\$	257,685	\$	364,350	\$ (106,665)
7 THERMAL/MOISTURE	\$	1,355,421	\$	590,962	\$ 764,459
8 OPENINGS	\$	3,927,372	\$	2,006,860	\$ 1,920,512
9 FINISHES	\$	2,862,389	\$	718,487	\$ 2,143,902
10 SPECIALTIES	\$	100,726	\$	193,270	\$ (92,544)
11 EQUIPMENT	\$	237,900	\$	185,657	\$ 52,243
12 FURNISHINGS	\$	654,737	\$	315,314	\$ 339,423
13 SPECIAL CONSTRUCT	\$	-	\$	6,043,542	\$ (6,043,542)
14 CONVEYING EQUIPMENT	\$	658,000	\$	845,275	\$ (187,275)
21 FIRE SUPPRESSION	\$	377,129	\$	409,324	\$ (32,195)
22 PLUMBING	\$	1,769,216	\$	1,384,704	\$ 384,512
23 HVAC	\$	696,034	\$	811,592	\$ (115,558)
26 ELECTRICAL	\$	2,673,907	\$	1,769,379	\$ 904,528
28 SAFETY/SECURITY	\$	-	\$	249,151	\$ (249,151)
31 EARTHWORK	\$	1,341,211	\$	1,170,234	\$ 170,977
32 EXT. IMPROVEMENT	\$	57,448	\$	260,438	\$ (202,990)
33 UTILITIES	\$	148,090	\$	149,490	\$ (1,400)
51 ALLOWANCES	\$	100,000	\$	-	\$ 100,000

Estimate A Total	\$27,128,523
Estimate B Total	\$25,668,761
<b>Total Variance</b>	<b>\$1,459,762</b>
<b>Percentage of initial estimate</b>	<b>5%</b>

\*Estimate A: Pre- Construction Budget estimate  
Estimate B: Actual Performance Budget

**Total Variance: \$1,459,762**

NOTE: In comparison between Estimate A (Initial Construction Cost) and Estimate B (Actual Performance), there was a \$1,459,762 difference. A 5% variation between the two estimates.

## Notes

Variance Report Source: Local Architect in Honolulu, HI

## Architect as Developer Advantage

A summary of possible cost driven design decisions in Case Study B

### Variance Report of Concrete and Furnishings

Type of Work	Estimate A	Estimate B	Variance	Comment
Concrete	\$4,846,377	\$1,372,621	\$3,473,756	Conventional sytem to precast system
Furnishings	\$654,737	\$315,314	\$339,423	Casework compromised

\*Estimate A: Pre- Construction Budget estimate

Estimate B: Actual Performance Budget

\$3.4 million cost savings on the concrete system could have been informed in the Pre-Construction Budget to improve Furnishings in Case Study B. The overall quality of spaces for residents would be improved in doing so.

## Architect as Developer Advantage

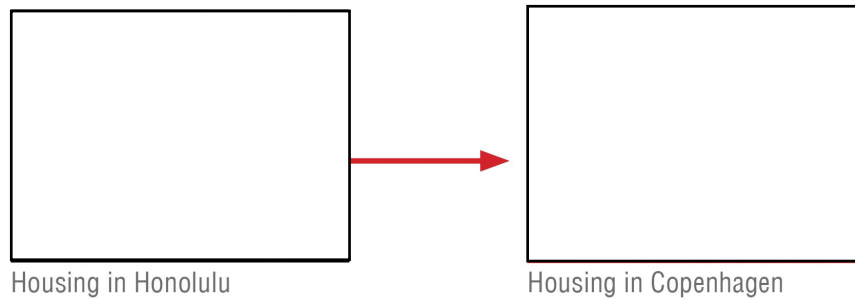
A summary of possible cost driven design decisions in Case Study B

### Basis of Proposal of Lanais

Lanais
Lanai floor finish based on Neogard type elastomeric coating
Ceiling finish at Lanais based on painted exposed structure
Allowance for sliding lanai glass doors are included at \$175/sf
Allowance of \$45,000 for window treatment is included
Allowance for lanai screens is included at \$100/sf

Lanai design was accounted for in the construction pro forma in the Basis of Proposal for Lanais in Case Study B

### Example of potential for cost driven design decisions



An example of a conventional lanai/façade design in Honolulu has potential to be designed better with cost driven decisions.

#### Notes

Housing in Honolulu: Existing housing located at 1074 Lunalilo Street<sup>117</sup>

Housing in Copenhagen: Existing housing located in Copenhagen, Denmark<sup>118</sup>

<sup>117</sup> [https://www.realtor.com/realestateandhomes-detail/1074-Lunalilo-St-Apt-304\\_Honolulu\\_HI\\_96822\\_M73233-61419](https://www.realtor.com/realestateandhomes-detail/1074-Lunalilo-St-Apt-304_Honolulu_HI_96822_M73233-61419)

<sup>118</sup> <https://www.dezeen.com/2018/10/09/big-bjarke-ingels-affordable-housing-dortheavej-residence-copenhagen/>

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